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Contractors and Engineers Monthly

Vol. 48, No. 4

APR 18 1951

APRIL, 1951



● Civil Defense

Just where does the construction industry fit into the picture? See page 3.

● Mansfield Hollow Dam

Its masonry spillway is flanked by dikes, as pictured and told on page 5.

● Concrete Paving

A special rig made light work of heavy steel reinforcing. Job details on page 11.

● AGC Meeting

Contractors were briefed on the equipment and materials outlook. Page 17.

● Hotel-Office, and Store

The huge structure described on page 24 will house hotel, office building, garage. Trusses will give a new store a clear main-floor selling area. Page 105.

● Roadside Parks

The Kentucky program includes overlooks and picnic-table sites. Page 30.

● Low-Cost Road Bases

Lime and fly ash mixed with soil or aggregates is the suggestion, page 33.

● Riprap Breakwater

It protects the docks in the great natural harbor at Portland, Maine. Page 36.

● Bituminous Paving

Surface gravel is treated with tar on a long road improvement. See page 41.
Two layers of cold-mix top a widened Hoosier road. Turn to page 90.
Three plant setups turn out the hot-mix for a road relocation. Page 108.

● Underwater Pipeline

Some 45 feet under, to be exact, and many sections weighed 26 tons. Page 46.

● Airport Paving

A 5,500-foot strip of RC concrete goes down on a 6-inch base in R. I. Page 52.

● Highway Department Lab

Texas technicians go on a quest for native base materials. Results: page 58.

● Turnpike Bridge

Eight piers, two abutments, go in for a Penn Turnpike river crossing. Page 64.

● Bright, on Maintenance

J. S. Bright looks to the critical future of maintenance. Interview, page 69.

● Lighting Night Work

Are you set to work at night if necessary? The article on page 74 is helpful.

● Grading

Page 82 proves once more that a small job profits from good organization.

● Canal Nears Completion

It's Friant-Kern, and the last of the concrete-paving work, on page 86.

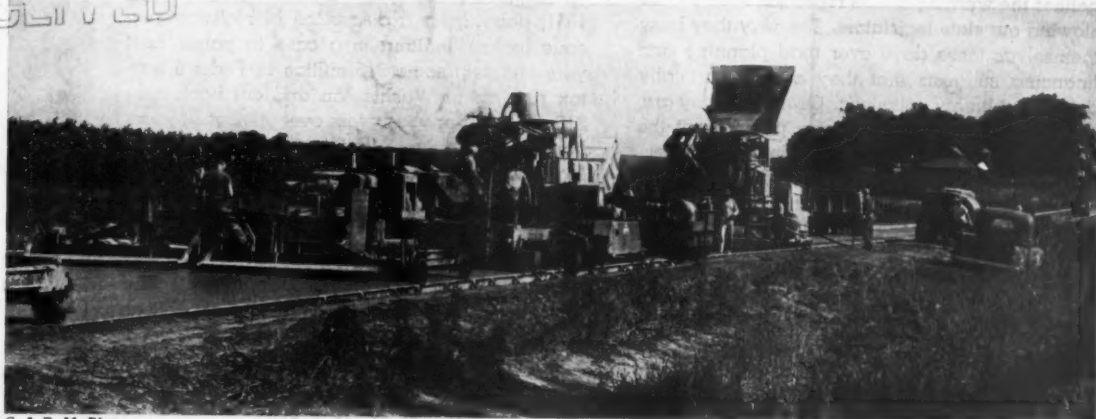
● Materials Controls

Page 94 covers their status and philosophy, especially as to steel.

● Sewer Outfall Placed

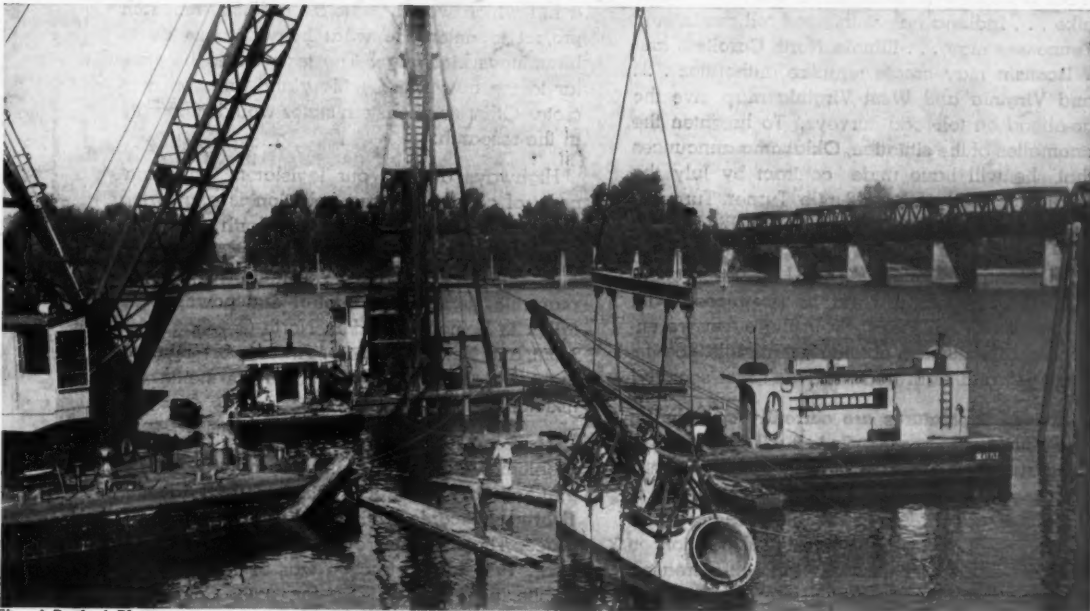
A big floating derrick placed the 200 tons of concrete on piles. Page 100.

(You will find "In This Issue" on page 4)



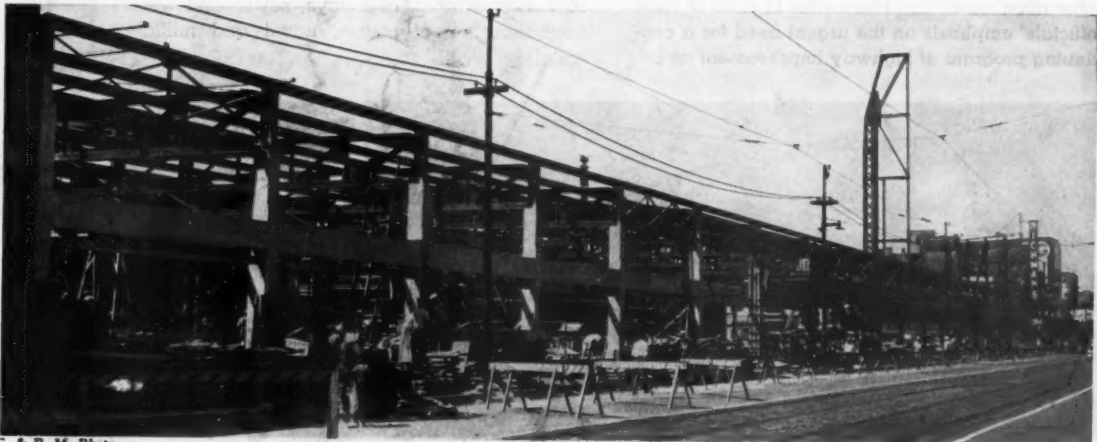
C. & E. M. Photo

CONCRETE ROAD. A new system of setting steel made this Fred Carlson Co. job through the Iowa cornfields especially interesting. (See page 11.) Note the two pavers, one inside the forms, one outside. They were used together on about 90 per cent of this fast-moving efficient job.



City of Portland Photo

SEWAGE PIPELINE. They called this job a "bearcat": laying pipeline on an underwater pile trestle to tie in with the new sewage-treatment plant the City of Portland, Oreg., is building. Page 46 covers this \$750,000 contract held by Manson Construction & Engineering Co.



C. & E. M. Photo

BRANCH STORE. Goldblatt Brothers has built a new one-story branch in Chicago, fronting on West Madison Street at Falski Road. Foundation and floors are reinforced-concrete. The roof is supported by steel trusses to give an unobstructed main-floor selling area. Page 105 reports the Inland Construction, Inc., contract.

NEWS AND VIEWS

of the construction industry at home and abroad — volume and trends, state and Federal legislation, labor and materials, people

Apparently it was not a bad dream but a cruel fact—Mobilization Director **Wilson's warning to New York's Governor Dewey that there will be "very little" steel for roads this year and next.** Wilson has since repeated the warning to Oklahoma's Governor Johnston Murray. However, **neither the warning nor its repetition seems to be slowing our state legislators.** The way they busy themselves these days over road planning and financing suggests that they are either totally deaf or sublimely optimistic. Or maybe they are, after all, the really long-range planners of the nation, who choose to go about their usual biennial law-making, uncertainties be damned.

Take toll roads. Though it was steel for New York's Thruway that first elicited Wilson's warning, New York legislators aren't deterred. They have amended their constitution to back Thruway Authority bonds with state credit and so save about 1½ per cent on interest rates. The amendment goes to the voters next fall for ratification . . . Though there is every possibility that Ohio's proposed \$300 million turnpike will be a mobilization casualty, legislators of other states are paying no heed. **Maine** is studying a bill to finance the extension of the Maine Turnpike . . . **Indiana** has authorized toll roads, and **Tennessee** may . . . **Illinois, North Carolina, and Wisconsin** may create turnpike authorities . . . and **Virginia and West Virginia** may give the go-ahead on toll-road surveys. To heighten the anomalies of the situation, **Oklahoma** announces that she will have under contract by July the whole roadbed of her 88-mile Turner Turnpike between Oklahoma City and Tulsa. Bid lettings start this month. Material shortage? Not worried, says Manager Bailey. "The U. S. Department of Commerce has advised us to proceed with the work . . . will assist us in the event we encounter difficulties in obtaining materials." Someone's left and right hands haven't met socially!

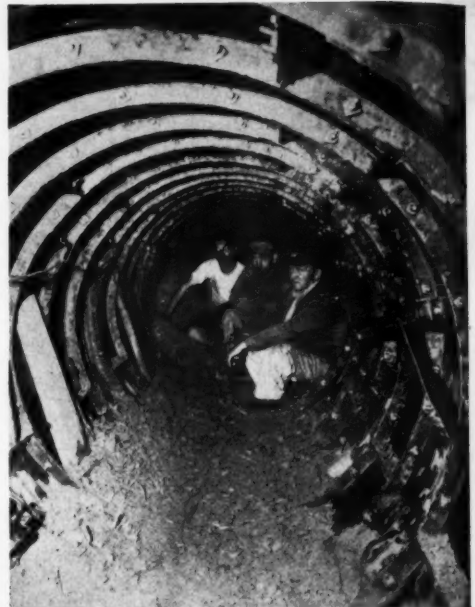
Sixteen legislatures are currently considering motor-fuel tax increases. So is the U. S. Congress, for that matter. Treasury Secretary Snyder has proposed to double the Federal gasoline tax to 3 cents a gallon. The National Highway Users Conference protests both the official position on steel for roads and the proposed tax increases. Wilson's warning, it says, shows signs of a return to the World War II philosophy that the country's road system is expendable; that as such, it must be content with what is left over after other needs are filled—this in spite of **road officials' emphasis on the urgent need for a continuing program of highway improvement** as im-

portant to national defense. If states amass highway funds that can't be spent during the emergency, says the NHUC, won't that be an irresistible invitation to divert those funds to non-highway purposes? As for Federal automotive excises, doubling them would encourage diversion on the Federal level. (See C. & E. M., March, 1951, page 3, for a discussion of highway revenue leaks.) **Indiana** is a case in point. Last year she sent some \$15 million in Federal gas-tax receipts to Washington and got back only \$10 million. Her yearly loss over the last 10 years has been more than \$4 million. Accordingly, her legislators have passed a resolution urging Congress not to double the gas tax, and asking that the state be allowed to retain all present gas taxes for use in repairing roads.

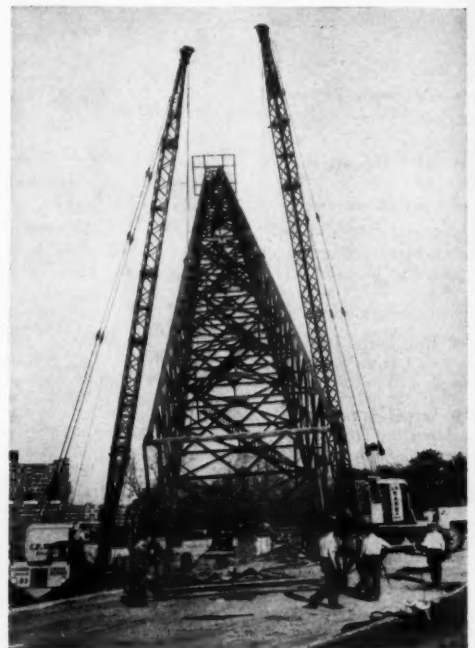
Some severe fines on overweight trucks are likely to be legislated this year too, as well as reductions in axle and gross weights. Wisconsin, for instance, will study penalties "as tough as we know how to make them"—the figures being bandied about are 2 cents a pound for overweight of 1,000 to 2,000 pounds, up to 10 cents a pound for overweight of 5,000 pounds or more . . . Tennessee legislators are mulling a bill which would authorize a \$7,500 **research project to determine what heavy trucks do to bituminous highways.** The tests would be similar to the now famous Maryland ones on concrete. Other southeastern states would cooperate in the research.

Highways are not our legislators' only concern, of course. **Stream pollution** is a growing challenge, and governors of North Carolina, Vermont, Minnesota, and Tennessee, among others, have urged their legislators to take appropriate steps. **Flood-control and power legislation** is being stressed in North Carolina, Vermont, and New Hampshire. And **airport improvement** is high on the list in Maine, Vermont, Minnesota, Kansas, and Missouri.

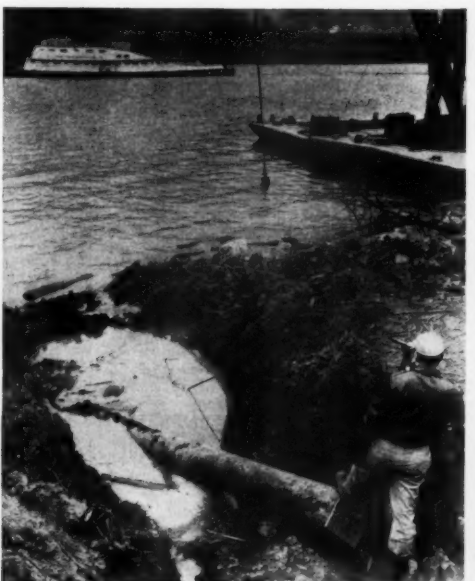
To close on the level of actual rather than problematical construction—Commerce reports that **February construction exceeded all previous February records,** with nearly \$2 billion put in place. That's 22 per cent above February last year. Private construction was \$1.5 million and public, \$435 million. So far, says Commerce, nearly all types of structures are being built in larger volume than a year ago—including homes, factories, stores, office buildings, churches, schools, highways, sewer and water facilities, and, of course, naval and military installations.



This 4½-foot-diameter sectional steel tunnel will house a 36-inch MC sewer to carry sewage to the Ohio River from a new treatment plant of The National Supply Co., Ambridge, Pa. The tunnel is 145 feet long and is being built by W. H. Schmidt Contracting Co., Ambridge.

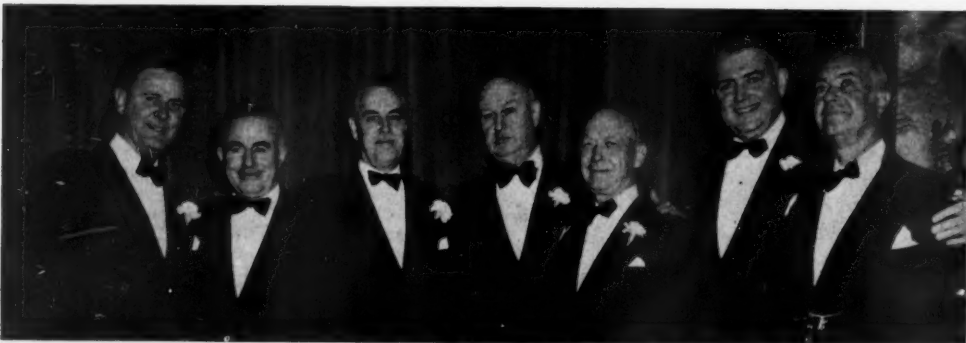


A couple of Lorain Moto-Cranes lift into place a 135-foot-high tower for the Bureau of Police Radio Station at Cobbs' Hill Reservoir in Rochester, N. Y. C. F. Ward owns the rigs; Genesee Steel Co. is the general contractor—both companies from Rochester.



Monongahela & Ohio Dredging Co. laid this new auxiliary water line across the Monongahela River to bring additional water to Donora and Monessen from the Charleroi, Pa., plant.

A. M. Byers Co. Photo



Spotlighters at The Moles 1951 award dinner. Far left and right, George F. Ferris and Edmund A. Frentis, who made the awards. Between, left to right, John S. Macdonald, Award Committee Chairman; Ray W. Spooner of Allen H. Spooner & Son, N. Y., member award winner; Hon. James A. Farley, made an honorary member; Lester H. Corey, head of Utah Construction Co., San Francisco, nonmember award winner; and Moles President James F. Salmon.

Construction's Role In Civilian Defense

Plans to Meet Emergencies Need Practical Know-How, Equipment, and Personnel of Construction Industry

AGC Recommendations

As a result of the AGC's study of the problem, it has made a number of
(Continued on page 103)

THE Federal, state, and local governments are seeking the cooperation of all citizens in planning and setting up an effective civil-defense program, the purpose of which is to minimize the devastating effects of possible attack on the people, the productive capacity, and the morale of this nation. Perhaps no single group in civilian life has a greater contribution to make to civil defense than the construction industry. Individually and collectively, civil-engineering contractors have a tremendous pool of knowledge, experience, know-how, trained personnel, and equipment which—in an emergency—can be mobilized for action with speed and effectiveness.

The Associated General Contractors of America is cooperating with the Federal Civil Defense Commission to make studies and recommendations on a nation-wide industry basis for the most effective use of general contracting organizations in the civil-defense program. Approved recommendations will be sent to its chapters and members so that they and all other contractors may cooperate with state and local civil-defense authorities. Action for preparedness, however, is on the local level. Here's how you can help now.

What YOU Can Do

State Civil Defense Commissions have been set up in most states, but their function is planning and advice; it is the responsibility of the city or town to work out the details of organizing and training defense units, and of planning how best to meet special problems, should that particular area be attacked. In some places, contractors and engineers, through their associations and societies, are already working with civil-defense authorities, but there are many localities where little positive action has been taken. If this is true in your community, you can

1. Check with your local contractor or engineering group, to urge that the association or society take the initiative in offering the services of its members to the local civil-defense officials.

2. If there is no contractor or engineering organization in your locality, try to get together the contractors, engineers, and equipment dealers in the community, to organize as a group for civil defense.

3. Or go, as an individual, to the local civil-defense officials; offer your services; point out the special resources and capabilities of the construction industry; and suggest that your civil-defense organization take steps to make the most of them.

4. Prepare a complete inventory of your equipment, supervisory and trained personnel, and equipment operators, with all pertinent data on location, names, addresses, and phone numbers, so that it will be ready for the civil-defense plan when asked for, or for your use in case disaster should strike before your local defense is fully organized.

5. See that your employees have first-aid training (an excellent idea for construction workers anyway) with the special additional training for A-bomb attack.

6. Help overcome the general public apathy toward civil defense by informing your employees of your firm's plans and share in the local program, and enlisting their cooperation and ideas.

Civil Defense Is Your Job Too

"Defense is a state of preparedness. Sound planning is the answer. We must take the same approach to civil defense that an engineer would use in undertaking a large construction project. Equipment and workers would be useless unless careful plans have been made for their effective effort. You and your organizations and your special training are needed in the civil-defense program."

"Civil defense is a community effort wherein everyone must do his share. It is everybody's job. Our American free way of life may depend upon it."—Frederick H. Zurmuhlen, Director, Public Works Emergency Division, New York City Office of Civil Defense.



U. S. Route 6, north of Lincoln, Nebr., receiving one of two 1½-inch lifts of Texaco Asphaltic Concrete.



Closely coordinated laying and rolling of asphalt mix speeded the project, causing minimum inconvenience to traffic.



While a new asphalt lift was laid on one side of the highway, traffic continued uninterrupted by the work.



Completed Texaco Asphaltic Concrete pavement, laid by the Abel Construction Company of Lincoln, Nebr.

Giving
an old pavement
a lift

Actually, it was a double lift which the Nebraska Department of Roads and Irrigation gave this 3½ mile section of U.S. Route 6 north of Lincoln last year. Each lift constructed on top of the existing concrete pavement consisted of a 1½-inch layer of hot-mixed, hot-laid Texaco Asphaltic Concrete.

Before construction of the two asphalt lifts, the State specified that the old filler in the expansion joints of the concrete pavement be cut out and replaced by asphalt mix. The mix used for this purpose was the same as that used for the lifts, except that large aggregate was omitted from the mix going into the joints. A 75-penetration Texaco Asphalt served as binder in the mix. The tack coat applied to the old pavement was Texaco RC-1 Cutback Asphalt.

Whatever your own road, street or airport paving problem, you will find an effective, economical solution in Texaco's complete range of Asphalt Cements, Cutback Asphalts and Slow-curing Asphaltic Oils. Refined from selected crudes, Texaco Asphalt products have helped construct and maintain America's highways for 45 years.

Two helpful booklets covering all types of Asphalt construction for streets, highways, airports, etc., may be secured by writing our nearest office.



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TEXACO ASPHALT

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Soil and Water Are Inseparable

One of the most important agreements engineers could make was arrived at recently at Spokane. There, during the National Reclamation Association's sessions, the nation's engineering leaders agreed that water and soil are inseparable.

Conservationists, who have been ahead of the engineers in this knowledge for a long time now, are applauding Major General Lewis A. Pick, Commissioner of Reclamation Michael W. Straus, and others who spoke the truth. But with practical good sense they are also asking, "How soon will these admissions mean more than talk?"

We hope it will be soon.

For until the intelligent use of soil and water comes to pass on a basinwide scale, irrigation and flood control cannot be wisely planned. So far, both soil and water resources have been misused shamefully. Accelerated soil erosion has silted reservoirs ahead of predicted schedules. Bad farming practices and the depletion of ground cover have permitted floodwaters to roar unchecked at the source. It was small wonder that the best engineering calculations turned out in many instances to be wrong.

Only when agriculture and forestry are accepted as a full-time working partner with engineering can the soil and water resources of any river basin be used to the fullest. River basins need more than steel and concrete. They need a balanced agriculture, ground-cover programs, and a multitude of detention reservoirs, small dams, and catch basins, especially in the upper reaches. All are needed urgently, probably more urgently than the multimillion-dollar dam projects

currently under construction.

If sound agriculture and this small-scale upper-basin construction can be accelerated soon, we believe that many basic natural laws will start to work in favor of the professional hydraulic engineers. These natural phenomena may even surprise the engineers pleasantly, by reversing many of the mistakes that have been made.

We dare say that flood frequency will diminish or disappear entirely in valleys where sound agriculture boosts the fertility and organic content of soils. We foresee a longer workable life for hydroelectric reservoirs; less need for new agricultural development. Depleted water tables can be restored. Geological processes that make soil can be speeded up. The destructive geological processes of surface erosion can be retarded.

Results would seem magic. The nightmarish shortage of new agricultural land wouldn't be such a problem if better farming boosted the output on today's acres.

The prudent use of soil and water is the last thing on earth that should require "selling". It is absolutely basic to national well-being. Indeed, the very survival of our standard of living, our ability to resist enemies, depend in large measure on how soon we stop abusing soil and water, and begin to use them wisely.

There is no time left. Farmers who fail to build up their lands are lazy and stupid. Engineers who reject sound agriculture as a working partner are criminally negligent. Soil and water, considered together, can solve a lot of problems besides flood control and reclamation. The time to get started with deeds is now.

This Story is Important

On page 69 of this issue appears an especially important Portrait in Print. Few people know highway maintenance as thoroughly as J. S. Bright does. Fewer have taken the time to think it through; to correlate present-day road upkeep with the lessons of the past and the probable emergency of the future.

We could editorialize favorably on all five of the major recommendations

Mr. Bright makes, for they are clear and expertly deduced. But Bright speaks much too eloquently for us to interfere. CONTRACTORS AND ENGINEERS MONTHLY is especially proud to present the former Deputy Commissioner of Public Roads, from his retirement in California. His story is "must" reading for everybody interested in highway maintenance.

Aftermath of the Truck-Load Test

Last September we ran an editorial lauding the Highway Research Board for the road test that it undertook in order to note the effect of heavy truck loads on a representative concrete

pavement. We wondered then whether the pavement would withstand the heavy loads or be broken into pieces. The 6-month test was concluded in December, and the HRB reported on

the results at its annual meeting in January. While some factions of the trucking industry are suggesting the results are not conclusive, an objective study of what the unbiased Research Board found is flatly convincing.

The report of observations confirmed most everyone's suspicions that heavy trucks do irreparable damage to our highways. The test section carrying the 44,800-pound tandem-axle loading was shut down long before the scheduled time in order to keep the concrete slabs from completely disintegrating.

After 92,000 truck passes, 96 per cent of the slabs under the 44,800-pound tandem-axle loads contained cracks that have been analyzed as constituting structural failures due to the application of the test axle loads. Only 27 per cent of the slabs in the section under 32,000-pound tandem-axle loads showed structural failures. In the other two sections after 238,000 truck passes, the 22,400-pound single-axle and the 18,000-pound single-axle loading strips indicated 64 per cent and 28 per cent respectively of slab failures. The answer is clear—the greater the loads, the greater the road failures, other conditions being equal.

State highway departments that have long insisted it costs more to construct and maintain roads used by heavy trucks than by light traffic, now have proof to back them up. Whether they will press for legislation to make the heavy truckers pay their fair share of taxes for the damage they are doing to the roads, or regulate them so as to prevent overloading, remains to be seen. Throughout the country there are great differences in load limits among the states. Standardization of loading regulations is long overdue.

Oregon has evolved a plan which New York is considering copying. Under this plan, vehicles are taxed according to both gross weight and miles traveled. For example, a gasoline-fueled truck, with a gross weight up to 3 tons, is taxed one mill per mile. The maximum permissible load—36 tons—is taxed 2.8 cents a mile for gas-propelled trucks. Diesel-driven vehicles, similarly loaded, pay 4.6 cents per mile because of the smaller tax on diesel fuel as compared with the gasoline tax. Maryland is discussing a tax plan on the same principle, with an impost of two mills per ton-mile on trucks of more than 25,000 pounds gross weight.

Such proposals seem like a more equitable way to tax the road user than most tax plans now in effect. Especially so when studies in New York State indicate that the owner of a light truck or passenger car is paying, in total users' fees, four times as much for using the highway as does a big trailer truck, when figured on the ton-mile basis.

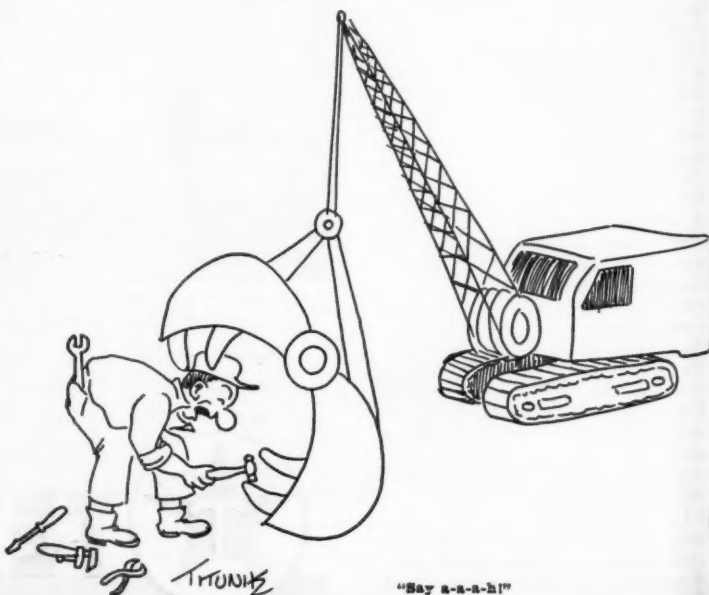
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This taxing method would square with the observations of the Highway Research Board in assessing the damage done to pavements by variously loaded vehicles. Strict enforcement of the mileage provisions may be the weak spot in such plans.

States imposing increased taxes on the highway user should divert none of that revenue to nonhighway purposes. Governor Dewey of New York State, faced with campaign promises made before the last election to raise salaries of state employees and teachers, needs additional revenue for these commitments. New York is now in the unenviable position of being fifth on the list of states diverting highway funds to other channels, using 17.4 per cent of such funds for nonhighway use. It makes little sense to increase the taxes on truckers if the money will not be used to construct new highways and properly maintain the ones being destroyed under heavy traffic. Neither is it wise to condone overloading by the military as was done in the last war. Too many so-called emergency overloads could easily have been avoided with better planning and foresight. Why protect the highways from the private truckers, only to let the military pound the pavements to pieces with overloaded vehicles?

Careful regular equipment maintenance is always a part of good management. Now, with critical materials allocated to the defense program, new equipment deliveries delayed, and costs mounting, maintenance is not only good business; it is essential, to stay in business. So take care of your machines.



"Say a-a-a-h!"

Concrete and Earth Dam Natchaug River

Masonry Spillway Section Is Flanked by Dikes on Mansfield Hollow Dam in Southern New England

By WILLIAM H. QUIRK,
Eastern Editor

• MANSFIELD Hollow Dam in Connecticut, scheduled for completion in November, 1952, but expected to be completed a year ahead of schedule, is the first dam to be constructed under the flood-control program authorized by Congress for the Thames River Valley after studies by the Corps of Engineers, U. S. Army, New England Division. This project, named after a small village in the Town of Mansfield, is 4 miles north of Willimantic, and about 30 miles east of Hartford, the state capital. After the high loss of life and tremendous damage caused by the flood and hurricane of September, 1938, the Army Engineers outlined their flood-control plan to protect the portion of southern New England located in the Thames River Valley.

In 1941, Congress authorized the Corps of Engineers to construct under this program seven dams—three in Connecticut and four in Massachusetts—and an improvement of the river channel to provide increased capacity at Norwich, Conn. World War II disrupted the well intentioned proposal, but the program was revived by post-war construction of the first stage of a channel improvement project at Norwich and the award in 1949 of a \$3,295,000 contract to D. V. Frione & Co., Inc., of New Haven, Conn., for the construction of Mansfield Hollow Dam.

None of the dams is on the Thames River itself, which empties into the Atlantic through Long Island and Block Island Sounds, but are on its tributaries. The Thames River starts just above Norwich, Conn., where the Shetucket, Quinebaug, and Yantic rivers form the broader and deeper stream. The Shetucket, in turn, is formed at Willimantic where the Natchaug and Willimantic rivers meet. Mansfield Hollow Dam, first and most seaward of the proposed structures, blocks the Natchaug river just below its confluence with Mount Hope river.

Mansfield Hollow Dam

Work on the dam got under way in July, 1949, with clearing and stripping of the site, in preparation for the construction of the concrete-masonry spillway section that is flanked by earth-dike embankments. When completed, the concrete, gravity, ogee-type spillway will have a crest length of 690 feet at elevation 257.0 mean sea level. The maximum height above the foundation rock is 66 feet for the overflow section, and 70 feet for the non-overflow portion. Maximum width through the bottom is 87 feet at the bucket section.

Lying roughly north and south, the spillway is divided into 24 monoliths numbered from north to south, or from right bank to left bank. Monoliths 3 to 22 inclusive, with the ogee crest section, are each 34 feet 6 inches long, and are built to the same 257.0 elevation. The two abutment monoliths, the control-house monolith at the north end, and the south entrance monolith, vary in size and height, with the maximum elevation fixed at 273.0 for monolith 1 at the north abutment.

The outlet works consist of five hydraulically operated sluice gates, measuring 5½ feet wide x 7 feet high, with three of the sills at 199.0 and two

at 195.0 elevation. They are placed in monoliths 7, 8, 9, 10, and 11. Gates are supplied by Phillips & Davies of Kenton, Ohio. Their discharge capacity at spillway elevation 257.0 is 9,700 cfs. The design discharge of the spillway is 105,900 cfs at the maximum surcharge of 11.5 feet.

From both ends of the concrete spillway, rolled-fill embankments run back to high ground. On the north side the earth section is 4,500 feet long, and 7,100 feet on the south side. The maximum height of the earth dam is 68



C. & E. M. Photo

The downstream face of Mansfield Hollow Dam. This concrete-masonry spillway is to be flanked by earth-dike embankments. D. V. Frione & Co. has the contract.

feet above the foundation excavation, and the maximum width is 313 feet measured through the base; top elevation is 273.0 and top width is 15 feet. On the upstream side the slope of embankment is 1 on 2½ from the bottom

to spillway elevation, and 1 on 2 from the spillway elevation to the top of dam; on the downstream side the slope is entirely 1 on 2. Freeboard above the spillway design flood crest is 4.5 feet.

(Continued on next page)

Count on this tire to cut costs!

**Two more reasons
why It Pays to
BUY and SPECIFY GOODYEAR!**

ALL-WEATHER Finest for flotation, rolling big loads faster	HARD ROCK LUG Super-tough champ for all types of rock work
---	---

OPERATING costs go d-o-w-n when you use the Goodyear Sure-Grip, the tire you know you can depend on for long, uninterrupted, economical service.

Sure-Grip is First Choice with cost-conscious construction men because its specially engineered O-P-E-N C-E-N-T-E-R tread and extra-massive, balanced lug bars make it tops for

drive-wheel traction—tops in terms of low cost per cubic yard, low cost per operating hour — over-all low cost that makes your equipment earn more for you!

GOODYEAR

We think you'll like "THE GREATEST STORY EVER TOLD"—Every Sunday—ABC Network

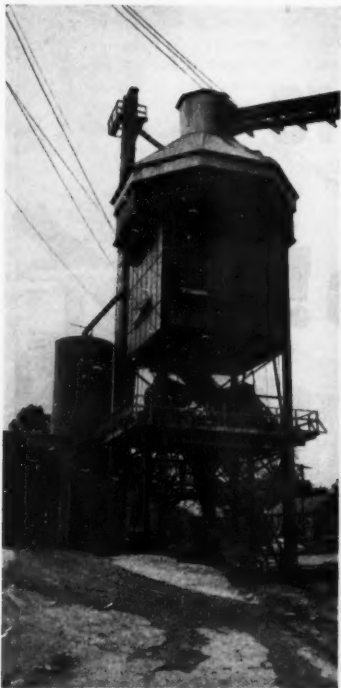
Sure-Grip, All-Weather—T. M.'s The Goodyear Tire & Rubber Company, Akron, Ohio



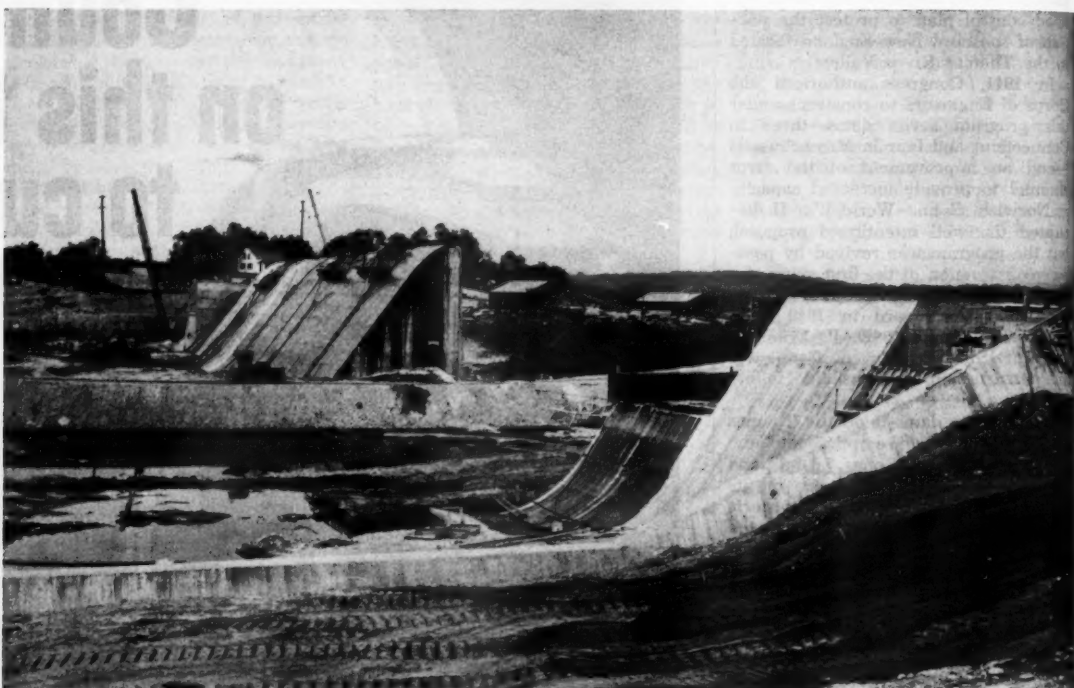
In a glacial-till area at the south end of the dam the contractor set up this Diamond grizzly screening plant, on concrete piers, to separate oversize rock from impervious embankment material.



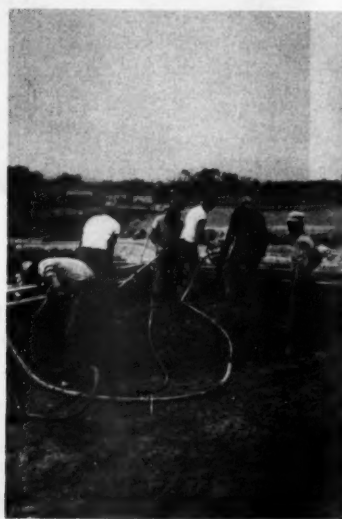
Another Diamond plant was set up in another borrow area to wash and screen sand and gravel for use as concrete sand and selected pervious embankment fill. Here a bottom-dump Euclid gets loaded with processed gravel, and concrete sand is dumped into a truck. The conveyor at left runs up to the plant from the source pit. This processing plant averaged from 80 to 100 yards of material per hour.



North of the dam is this Johnson batch plant with two Koehring 2-yard mixers. A Ford truck gets a bucket of concrete.



From the south side of the Natchaug River looking at the north half of the concrete spillway. A truck with a 2-yard bucket of concrete moves along the top of the cofferdam used as a haul road on the way to the south side of the job. The structure, when completed, will contain 72,000 yards of concrete. During the summer of 1950, an average of 450 yards was placed per day.



At left, a P&H crane with a 90-foot boom swings a Johnson 2-yard bucket over the forms at the north end of the dam. Above, 1 and 2-man Chicago Pneumatic vibrators knock down a pile of concrete just deposited. The concrete went up in 5-foot lifts, usually with a 5-day interval between lifts.

C. & E. M. Photos

Concrete and Earth Dam Natchaug River

(Continued from preceding page)

Besides these two portions of earth dam there are six saddle dikes of varying height and totaling 2,400 feet in length, closing saddles in the rim of the lower end of the reservoir. Bottom elevation of the reservoir is 199.1. When the water reaches spillway crest elevation 257.0, the reservoir area will consist of 1,950 acres. This constitutes a storage capacity of 51,000 acre-feet, or a 6-inch runoff from the watershed which has an area of 159 square miles.

Land required for the reservoir area is being purchased in fee by the Government and all buildings will be cleared from the area by relocation or demolition. Land suitable for agricultural uses will be available for such use under leasing arrangements. The possibility of inundation of these lands by impounded floodwater will always exist, however, and the assumption of this risk by the lessee will be a condition of every lease.

Some tentative negotiations have been undertaken by the city of Willimantic to supplement its water supply

by means of storage to elevation 210, approximately, in the newly formed reservoir. At present the city gets its water from Willimantic Reservoir, downstream from the dam. The normal flow of the river can be carried by the five conduits through the spillway section. They are placed at the original location of the riverbed.

Construction Scheduling

From site stripping late in July, 1949, until winter closed in early that December, the contractor accomplished satisfactory progress in two swamp areas through which the embankment portion of the dam is located. Peat was removed down to hard bottom, and the earth fill was built up to a point above ground-water level in these areas. At the same time some test embankments were constructed of various types of materials so as to check and verify the compaction methods in use.

Approximately 75 per cent of the total embankment yardage is in the south wing of the dam, since the north wing is on higher ground. This south embankment roughly parallels the Natchaug River, at least 500 feet down-

(Continued on next page)

stream from its left bank; a long diversion channel was dug to keep the meandering river away from the rolled fill. High ground in the area between the river and dam was one of the sources of borrow for embankment material. Several other borrow areas were available, and it is expected that at least five of these will have been used by the time the embankment has been completed. A considerable quantity of suitable embankment material was recovered also from excavation for the spillway structure and discharge channel.

The earth dam has a core of random material flanked by pervious fill on the downstream side, with the outer slope line covered with a one-foot layer of processed gravel. On the upstream side impervious fill goes up against the random-fill core. Over the impervious material is a 3-foot blanket of selected pervious on which is placed 18 inches of toe drains was installed at the bottom of the downstream slope, along a considerable portion of the south wing, to control seepage through the pervious foundation which in this area is mostly sand and gravel.

Dirt Cofferdams

Through the 1949-1950 winter and early spring, construction proceeded with excavation in the spillway area. Overburden was removed, and the unsound rock stripped off to provide a suitable foundation for the concrete spillway and nonoverflow monoliths. Upstream of the dam a work bridge was thrown across the river, with the timber deck supported on I-beam stringers resting on timber cribbing filled with rock. Dirt cofferdams were built out from both banks, the north side to 212.0 and the south side to 210.0 elevations, so that work could be carried on from both sides of the river at the same time.

On April 12, 1950, the first-stage diversion was effected, with the river being shifted over to the south or left-bank side of the valley. The north cofferdam extended out far enough to include the first twelve monoliths, and its top served as an access road to the work bridge across the river. The south cofferdam took in monoliths 19 to 24 inclusive, leaving the diverted river to flow through the gap to be filled in later by monoliths 13 to 18. By the end of the 1950 construction season, about 75



C. & B. M. Photo

A Wagnermobile Duo-Way scoop loads a truck with $1\frac{1}{4}$ yards of aggregate.

per cent of the rolled-fill embankments were completed, along with approximately 80 per cent of the concrete placing.

The first mass concrete was placed in the structure on May 3, 1950, and by October 6 the spillway was far enough along to divert the water back

into its original bed. The two low conduits in monoliths 9 and 10, with invert grades at 195.0 elevation, can accommodate the flow of the river at most stages, but the other three outlets, with slightly higher grade lines at 199.0, were available for use if necessary.

Some concrete was placed in these 13 to 18 closure monoliths before the end of 1950. This year the remainder of the rolled fills will be completed, and the rest of the concrete placed in the dam and training walls that extend downstream from the dam along both sides. Some minor items connected with the project but not included in the present contract, such as reservoir clearing and relocation of roads and utilities, will extend over into next year.

Dirt-Moving

Excavation on the project will total 2,401,500 cubic yards, with 2,363,500 yards of this being common or earth.

(Continued on next page)



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Concrete and Earth Dam Natchaug River

(Continued from preceding page)

and the remaining 38,000 yards consisting of rock. Air for the rock-drilling equipment as well as for other job air requirements was supplied by 6 Ingersoll-Rand compressors: one at 500 cfm and the others rated at 315 cfm. Shovels on the job included 2 Marions—1½ and ¾-yard machines—and 5 Northwests—three at 2½ yards, a 1½, and a ¾-yard unit. Euclids, 6 bottom-dumps and 9 end-dumps carrying about 13 yards a load, moved the bulk of the dirt and rock, assisted by 2 Macks and 13 hired trucks of various sizes and makes.

The major source of material for the

random, pervious, and selected pervious fills in the south wing of the embankment came from along the left bank of the river, with medium-length hauls prevailing for the most part. A limited amount of the impervious material was obtained from the overburden excavation of the spillway, while the bulk of it came from a borrow pit at the extreme southern end of the project. This glacial-till area is downstream of the embankment, adjoining the south side of the Windham Airport; U. S. 6 cuts through one end of the pit.

In the sidehill of this pit the contractor set up a Diamond grizzly-type screening plant on concrete pier foundations. This plant was used to separate oversize rocks from impervious material to be placed in areas where space limitations or other considera-

tions made it undesirable to cull at the point of placement. One of the shovels cut into the sides of the pit, loading three trucks that emptied into the receiving hopper at the top of the plant. Stone from the glacial till was screened out and stockpiled at the side for use later on the upstream slope of the embankments. Material passing the 6-inch screen dropped into a hopper which discharged into end-dump Euclids, four or five of which carried the impervious till to the dam, a haul distance of about 4,000 feet. The capacity of this grizzly screening plant is 150 yards per hour.

Washing and Screening Plant

Another Diamond plant was set up at one of the borrow areas for pervious material, to wash and screen the sand and gravel for use as concrete sand and

selected pervious fill. Shovel-loaded trucks from the source pit fed a receiving hopper from which a conveyor ran up to the plant. After washing, the material screened from No. 4 sieve down in size was collected in hoppers that discharged below into a fleet of trucks. They hauled the sand away to stockpiles for use in the concrete. Material from 6-inch down to No. 4 went into another hopper which dumped into bottom-dump Euclids for hauling to the dam. This grade served as the processed-gravel blanket on the downstream slope. The plant also produced, by a dry-screening process, a sand-and-gravel mixture from which only a part of the minus No. 4 was removed, which was used in considerable quantity as a filter material in the toe drainage system. Stone over 6-inch in size was wasted, being too small for use as rock fill. This processing plant averaged from 80 to 100 yards of material per hour.

Random, pervious, and select pervious material was spread on the embankments and compacted in 9-inch lifts to 95 per cent of laboratory compaction obtainable by the so-called Providence vibrated density test. The impervious material was spread and compacted in 6-inch lifts to 95 per cent modified Proctor density. Spreading was accomplished by dozers and an Austin-Western motor grader. Dozers available for spreading and other uses included 2 Allis-Chalmers HD-19's, 5 International TD-18's, and 4 Caterpillar D8's. Compaction of the random and pervious materials was achieved by rolling four passes with the heavier dozers. Water was added from three tank trucks and hand hose. A 2½-inch pipeline laid along the center line of the fill supplied water to the hose, the water being pumped into the line from the river. The impervious material was compacted by tractor-drawn sheepfoot rollers, the material being moistened to optimum water content by the addition of water from tank trucks.

Batching and Mixing Concrete

Downstream on the north side of the dam the contractor set up a C. S. Johnson automatic batching and recording system of concrete plant equipped with 2 Koehring heavy-duty 2-yard mixers. Crushed traprock for the coarse aggregate was supplied in three sizes by Lane's Quarry at Westfield, Mass., and shipped to a siding of the New Haven Railroad at North Windham, Conn., about one mile from the job site. There it was unloaded by an under-the-track conveyor into trucks that hauled the stone to the plant.

Bulk cement was delivered to the same siding from two sources—the North American plant at Howes Cave, N. Y., and the Lehigh plant at Sandts Eddy, Pa., and stored in a 500-barrel Johnson bin. It was hauled to the batch plant by a truck holding 50 barrels, and stored in an 800-barrel silo alongside the tower and in a 500-barrel bin atop the plant. An enclosed elevator raised the cement to the storage facilities.

Electricity for some job operations was supplied by the Connecticut Light & Power Co., but the concrete batch plant had its own unit—a Murphy diesel engine hooked up with an E-M 133-kw synchronous generator—which supplied current to run the plant, some pumps, and lighting at the batcher. Water for the mix was pumped from the river below the site by an Ingersoll-Rand 500-gpm pump driven by a Westinghouse 40-hp motor. Compressed air for plant operations was furnished by an I-R 500-cfm compressor.

The Mix

Batches were mixed 2 minutes, and then discharged into a hopper which emptied into 2-yard buckets carried on Ford dump trucks which run under-

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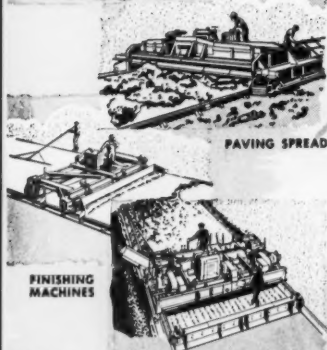
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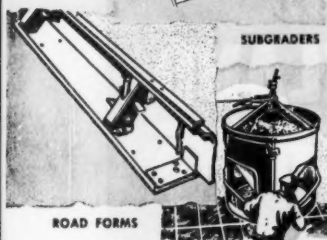
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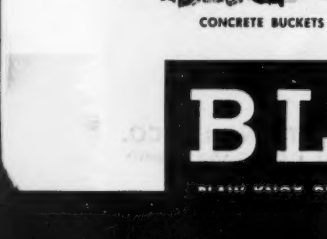
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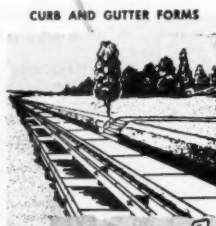


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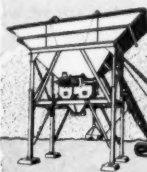


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BULK CEMENT PLANTS

BLAW-KNOX

neath the tower. Four of these buckets were C. S. Johnson Lo-Slump buckets with air-operated discharge. The fifth was a hand-operated Blaw-Knox bucket. The trucks transported the buckets over a short haul to the dam. Batching was a continuous operation for as long as 20 hours at a stretch during some of the concrete placing. The batch bin held 100 tons of each type of aggregate, and these were replaced through a long conveyor that ran up from a receiving hopper on the ground. Trucks hauled sand and stone from the stockpiles to the hopper. A Wagnermobile Duo-Way scoop loaded aggregate into the trucks from the stockpiles.

Darex air-entraining agent was added to the mixing water for each batch in order to give the concrete approximately 4 per cent air content. The average slump was around 2 inches. Surface dry weights of a 2-yard batch of mass concrete mixed in the proportions 1:2.73:7.36 are as follows:

Cement	752 lbs.
Water	360 lbs.
Sand	2,054 lbs.
1/2-inch stone	1,125 lbs.
1 1/2-inch stone	2,248 lbs.
3-inch stone	2,248 lbs.
Total	8,787 lbs.

Concrete Placing

The bulk of the mass concrete is plain, only the portions around the galleries, gate chambers, and small pours being reinforced. This steel amounting to around 375,000 pounds was furnished by Truscon Steel Co. of Long Island City, N. Y. Irvington steel forms, faced with 2 x 5-inch tongue-and-groove sheathing, were made up in 4 1/2 and 10-foot lengths, with a few odd sizes also constructed for special purposes in the odd-length monoliths. Six complete sets of these cantilever-type forms were available for use on as many separate monoliths. The concrete went up in 5-foot lifts, with a 5-day interval between lifts. As the forms were raised for the next higher lift, they were secured to the concrete below with 2-inch lag bolts. For the typical 34 1/2-foot monolith, four forms were used to a side—three 10-foot sections and one 4 1/2-foot form.

A P&H crawler crane with a 90-foot boom, a 2 1/2-yard rig, handled most of the concrete placing as it swung the 2-yard buckets from the trucks to the forms. A Northwest machine of similar capacity and similarly rigged also placed concrete when two different pours were going on at the same time. As the big pile of concrete was placed in the forms from the bucket, it was knocked down and spread out by Chicago Pneumatic one and two-man vibrators.

Before a new lift was added, the already-placed concrete was cut back with air and water jets to clean and roughen the surface for a tight bond. Curing was done with water, a spray being furnished from perforated pipe laid on top of the concrete. Water was pumped from the river by I-R 3 and 4-inch electric pumps. Concreting operations usually carried over into three work shifts because of the various steps in the placing, curing, cutting, and shifting of forms. The structure when completed will contain 72,000 yards of concrete, and during the summer of 1950 an average of 450 yards was placed per day. The dirt-moving was usually kept to one shift.

Quantities and Personnel

The major items in the Mansfield Hollow Dam contract include:

General excavation	1,150,000 cu. yds.
Trench excavation	68,500 cu. yds.
Borrow excavation	1,145,000 cu. yds.
Rock excavation	18,000 cu. yds.
Rock borrow	20,000 cu. yds.
Roller-fill embankment	1,100,000 cu. yds.
Selected pervious	220,000 cu. yds.
Rock fill	66,000 cu. yds.
Concrete	72,000 cu. yds.
Cement	80,000 bbls.
Reinforcing steel	375,000 lbs.

D. V. Friene & Co., Inc., employed a force of 250 men at the peak of operations under the direction of Joseph A. DeLucia, General Superintendent, assisted by Vincent Sullivan, Superintendent on the earthwork; Morris Rogers, Superintendent on the concrete; and Robert Butler, Office Engineer.

Col. H. J. Woodbury is New England Division Engineer in charge of the project for the Corps of Engineers. He is represented on the site by Robert S. Johnson, Resident Engineer. C. J. Murray is Chief of the Construction Division and E. H. Brown is Chief of the Supervision and Inspection Branch.

Reisser Joins Bucket Company

Vernon H. Reisser is now Vice President in Charge of Engineering for Drake-Williams-Mount Co., Omaha, Nebr., manufacturer of dragline buckets. He was formerly President of American Road Equipment Co., also of Omaha.

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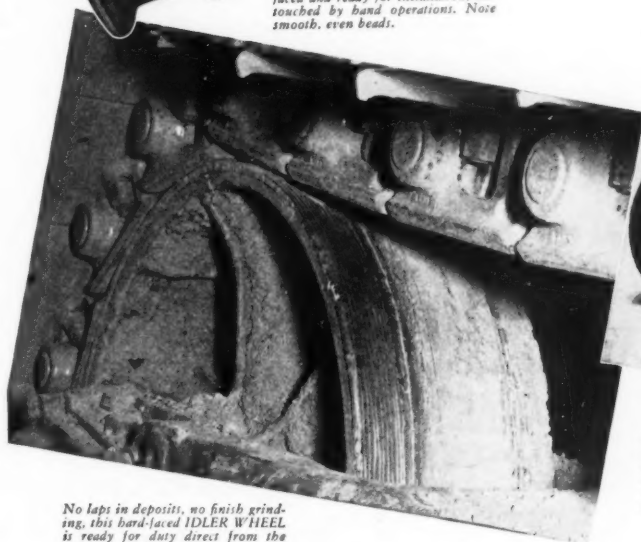
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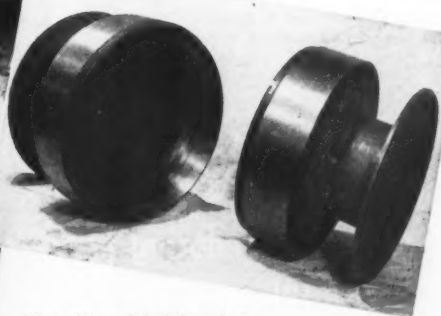
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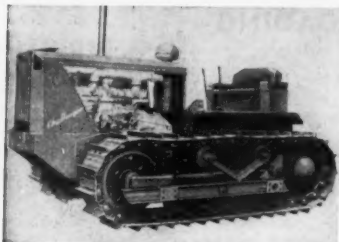
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The Challenger Mark III diesel crawler tractor is a British model distributed in this country by John M. H. Shline Co., New York, N. Y. Its engine develops 95 bhp at 1,550 rpm, providing 82.4 hp at the drawbar.

New Diesel Crawlers

A new line of British diesel crawler tractors with a power range from 20 to 95 hp is now available from John M. H. Shline Co., 342 Madison Ave., New York 17, N. Y. This firm has been appointed exclusive distributor in the United States for the crawler diesels manufactured by John Fowler & Co. (Leeds) Ltd. and Marshall Sons & Co. Ltd., both of England.

The largest of these units is the Challenger Mark III which is powered by a 6-cylinder 4-stroke Meadows engine. The engine develops 95 bhp at 1,550 rpm, providing 82.4 hp at the drawbar. The main engine clutches are of the spring-loaded plate type. The Challenger has 6 forward speeds, up to 5.67 mph, and 4 reverse speeds up to 5.13 mph. At additional cost, the tractor can be supplied with a gear box having two ranges of speed, thereby giving 12 forward and 8 reverse speeds. Tracks have a contact area 20 inches wide and 94 inches long. The weight of the unit in working order is approximately 23,600 pounds.

Further information on this and other models may be secured from John M. H. Shline Co. Or use the Request Card at page 16. Circle No. 816.

Pressure-Treated Wood

A new booklet on Penta pressure-treated wood, "Pointers on Penta", is offered by The Dow Chemical Co., Midland, Mich. It gives technical information for the industrial user so that he can better adapt the various Penta treatments to meet his requirements. The booklet is designed to guide the user in discussing types of treat-

ment with wood-treating companies.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 738.

Multipurpose Tool Cuts, Saws, Powers

A new multipurpose tool for use as a brush cutter, portable saw, and independent power unit has been developed by Kut-Kwick Tool Corp., P. O. Box 476, Brunswick, Ga. According to the company, this unit can be used for cutting brush and trees, sawing fallen timber, mowing grass, or as an independent power source for operating small mixers, paint sprayers, stationary saw tables, grease guns, grinders, etc.

These gasoline-powered units are self-propelled and wheel-mounted. Saw blades come in sizes ranging from 20 to 32 inches. A single motion shifts the saw blade from horizontal to vertical position. For cutting brush or grass the blade is adjustable between



In addition to its regular functions as saw, brush cutter, and grass mower, the Kut-Kwick, Jr., can serve as a portable power unit.

$\frac{3}{4}$ and 4-inch cutting heights. The Kut-Kwick units are available with power ranges up to 8 $\frac{1}{2}$ hp.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 703.

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Digs clean trench—no ramp to be
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Reinforcing Steel No Paving Problem

Iowa Contractor Hurries Concrete Paving by Using Special Machine to Insert Steel From Above

(Photo on page 1)

• **HEAVIER** steel reinforcement in concrete paving promised to bring higher costs, until an Iowa paving contractor devised special equipment. When Assistant Construction Engineer R. E. Merrill suggested and Fred Carlson Co. of Decorah, Iowa, perfected a new and improved machine for setting steel, the Iowa State Highway Commission began to chalk up 10-8-10-inch paving footages of 2,700 feet and over in an 8-hour shift.

Special shop-built adaptations on a Blaw-Knox spreader, and a vibratory steel-insertion machine built by Heltzel did the trick. The shop-built guide arms on the spreader first laid the longitudinal bars in the center of the slab. These were guided in place by steel shoes on fixed pipe supports. Transverse steel bars were then vibrated down to rest on the longitudinal reinforcement. Several check tests showed the steel to be positioned perfectly in the slab.

The new system was tried for the first time in Iowa on a 17-mile section of State Route 14, north of Newton. Carlson's \$850,000 contract included three sections which had previously been graded and shaped. Four bridges were in the contract limits, but they had previously been built.

Men and equipment moved in late in 1949, but little was done because of bad weather. Paving started to roll along on April 18, and slightly less than 4 months later, was complete.

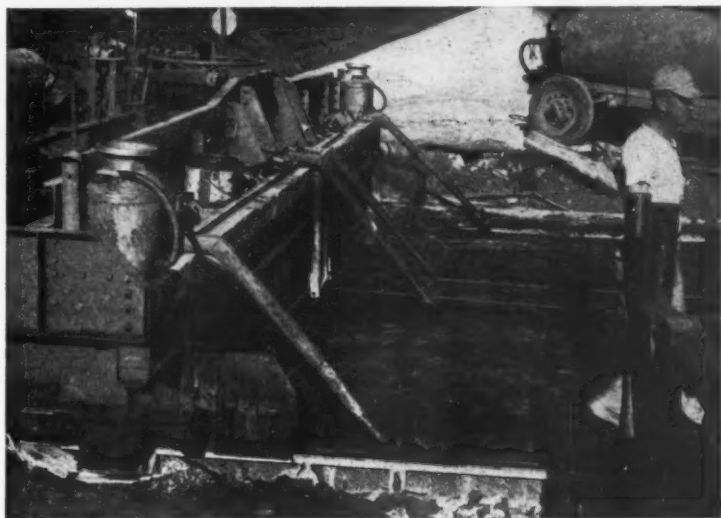
The 22-foot 10-8-10 concrete slab closed up one of the remaining gaps in the important north-south secondary state highway. Iowa has for several years intensified its battle to get the people on paved highways, and this job exemplified that policy. Farmers for miles around showed keen interest in workmanship and progress. Iowans will even sign petitions and take them

to Ames when it comes to the matter of roads in their district.

Forms and Fine-Grading Start

Carlson's first job was to shape up enough grade ahead of paving, and set forms. The outfit planned to use two pavers, which would move the slab right along. To make certain that there would be enough steel forms to stay ahead, 4,000 road-feet of 10 x 10-inch Blaw-Knox steel sections were used. They were set 22 feet apart in a shallow

(Continued on next page)



L. & B. M. Photo

Shop-made steel arms and shoes on the front of this Blaw-Knox spreader support longitudinal steel reinforcement as it is placed in Iowa State Route 14.



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Makes more durable concrete

Because water gain and segregation are minimized by Duraplastic's air-entraining feature, the resulting concrete is fortified against the effects of freezing-thawing weather. (Left, Administration Building, McLaughlin Field, Hot Springs, Ark. Architects: Erhart, Eichenbaum and Rauch, Little Rock; contractors, Peterson & McFadyen, Little Rock.)

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CE-D-117



C. & E. M. Photo

A Cleveland tamper compacts dirt under B-K forms on the Carlson Co. job.

Reinforcing Steel No Paving Problem

(Continued from preceding page)

cut dug by a Carr Formgrader—whose operator was described irrelevantly as a "chicken picker".

It was so important to get the forms on firm footing that 2 Cleveland mechanical tampers were used. One worked on each line of forms. Minor adjustments to line and grade were the rule, because the contractor and the state highway men had a common interest in seeing to it that the forms were straight and solid.

The form gang included a foreman, a liner, 2 setters with 2 setter-helpers, 6 to 8 laborers, and operators for the pin driver, tampers, and the Form-grader.

Subgrade fine-grading really began before the forms were set. Slight grading irregularities were corrected ahead of the forms by an International TD-14 tractor and a Bucyrus-Erie S-68 scraper. After they had finished, the forms were set and some fine-blading was done by an Adams No. 512 motor grader. A Caterpillar No. 112 also helped.

Final fine-grading, which polished the earth to close tolerance, was done by a Blaw-Knox machine. It had a steel ramp over its frame so batch trucks could cross easily. Excess dirt scraped up by the subgrader was dropped outside the forms, and a motor grader quickly leveled it so trucks and other local traffic could use the shoulders to get through.

Double Pavers

Two Koehring Twinbatch 34-E pavers were used simultaneously on at least 90 per cent of the job, with a single set of finishing and spreader machines. On a job let in 1950 that would have been an impossibility, because the Iowa State Highway Commission recently changed its paving specifications. If two pavers are used on the new contracts, two sets of finishing equipment and bullfloats must be used also.

One paver was spotted between the forms, and the other worked from the shoulder. Temporary turnarounds were created by motor graders so batch trucks could back in to the shoulder-located machine. Mixing water for both pavers was pumped from streams nearby, hauled by tank trucks, and transferred to trailer-tanks which each paver towed along behind it.

The elimination of the usual slow, cluttered crew which installs reinforcement was one of the interesting highlights. Four $\frac{5}{8}$ -inch longitudinal bars passed through the pavement. Two were 9 inches inside the edges, and centered in the slab 4 inches from the surface. Two lay along the longitudinal center joint, 9 inches in.

This steel was laid ahead continually, and the bars were spliced and tied. As the paver inside the forms moved along, holes in the drag blade automatically picked up and centered the longitudinal bars. Steel shoes on fixed supports back at the spreader positioned the bars correctly in relation to the

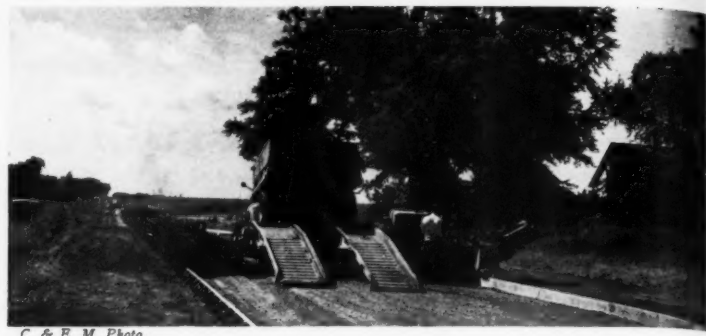
top of the slab.

Transverse steel bars, of $\frac{1}{2}$ -inch diameter, were vibrated into the concrete by the Heltzel machine. These were placed on 4-foot-staggered centers.

Plans also called for asphalt subgrade paper under the slab. Rolls of this material, 48 inches wide and 250 feet long, were carried along at the paver. Six rolls were needed to reach across between forms. During most of the job it was unrolled by two men, but toward the last the contractor had practically perfected a mechanical spool to handle the paper automatically.

The best day's run was 2,734 feet, and average footages of 2,000 to 2,300 feet were commonplace.

Concrete was handled behind the paver by a series of spreaders and finishers. After the big paver buckets had dumped the mix to the pour, a Blaw-Knox spreader worked it evenly between the forms. The Heltzel steel machine followed. A Jaeger-Lakewood finisher, with a Jackson tube vibrator,



C. & E. M. Photo

A Blaw-Knox subgrader works while a batch truck crosses on its way to the paver.

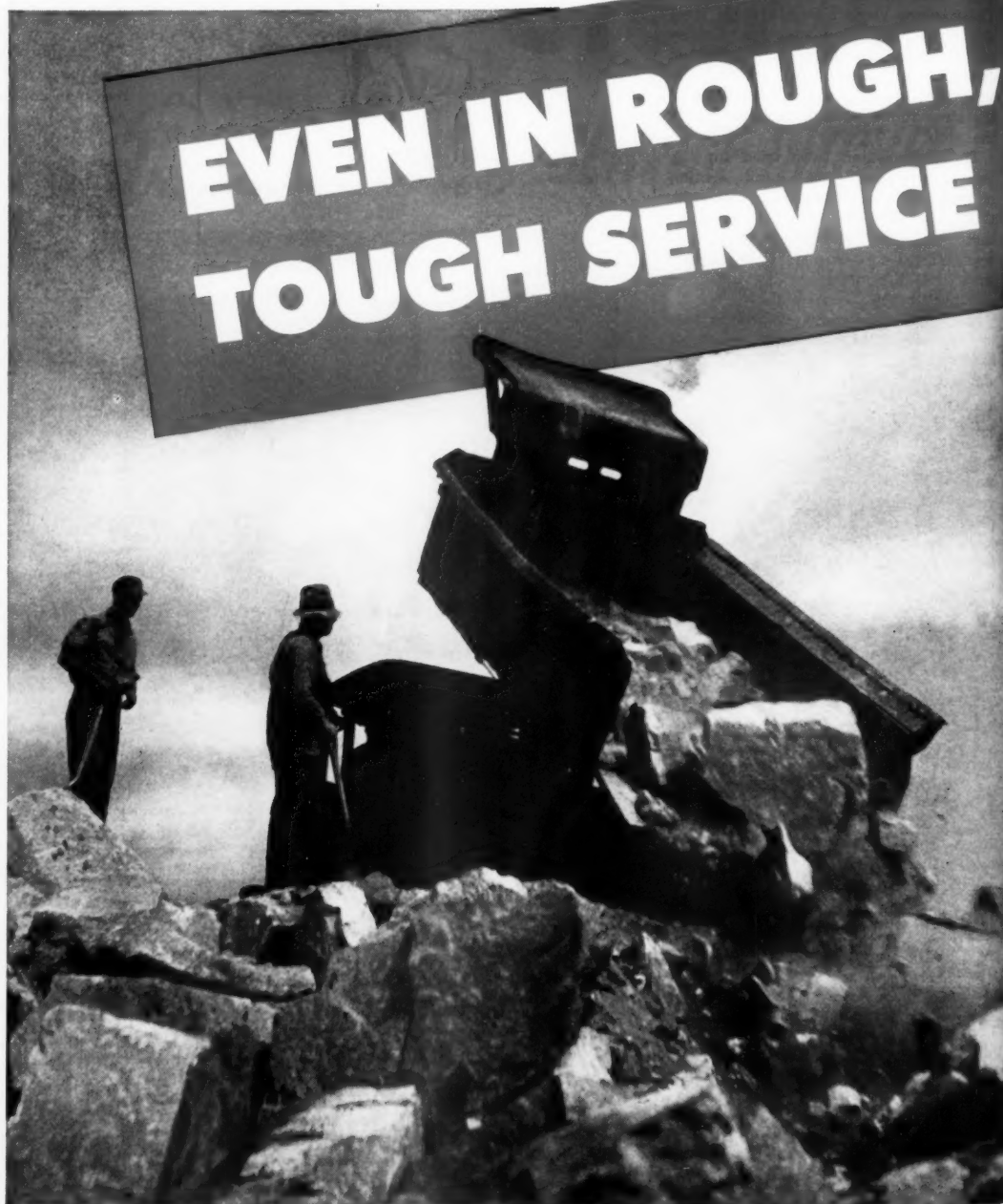
then made one or two passes. The center strip, consisting of asphaltic mastic, was placed by a Cleft-Plane joint installer. A Koehring single-screed transverse finisher completed the picture, except for routine hand work.

There were expansion joints only at the bridge ends, and no contraction

joints. Construction joints at the end of a day's work consisted of a header board with steel dowel bars for load transfer.

So far as curing was concerned, it was handled for the first 24 hours by wet burlap covering. Then the burlap was removed, and Hunt Process Clear

(Concluded on next page)



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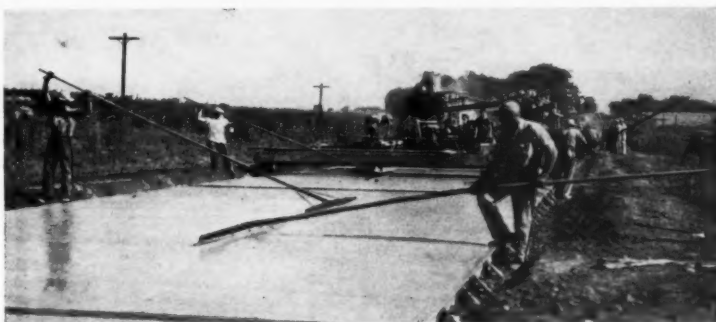
solution applied by spray. Forms were removed and moved ahead the day after the concrete was poured. Pins were pulled by a manual extractor. A winch truck loaded from 34 to 36 sections for each trip ahead to the setting point.

Two Batch-Plant Moves

The 17-mile job was handled with two batch-plant moves. The first 8 miles was handled with the batch plant set up in the town of Laurel. Later, when the other 9 miles was under way, the batch plant was erected 5 miles east of Baxter.

Sand and gravel arrived at Baxter in hopper-bottom railroad cars. A track trap with Barber-Greene leadout conveyors transferred the sand and gravel via bins to waiting dump trucks, which hauled it away to stockpiles and bins at the Johnson batch plant. A Koehring 605 clam transferred the sand and aggregate from stockpile to bins above the weighing scales.

Hawkeye and Dewey bulk portland cement came via hopper-bottom rail-



C. & E. M. Photo

From the finishing end of the Iowa job, men with long-handled floats go into action, working hard to stay up with the fast-moving pavers in the background.

road cars also. At the railroad siding there was a Johnson cement charger and a Dutch Mill, which loaded the transfer trucks. The cement eventually wound up in a 400-barrel Blaw-Knox silo, which batched it to the waiting fleet of trucks.

The Carlson outfit has a permanent

fleet of ten K-7 International batch trucks, but upward of 20 rented Fords and Chevrolets also were used. Each truck was equipped to haul two 1½-yard batches.

Iowans in a Hurry!

Every state highway department likes

to believe that people in its territory cause construction trouble, and the belief is not usually without good cause. On this project, local residents were so anxious to try out the new slab that good strong barricades didn't always stop them. As soon as the concrete hardened, if no one stopped them, motorists would somehow get on the pavement.

Personnel

Field work for the Iowa Highway Commission was handled by Resident Engineer Jack Durham, working under Chief Engineer Fred R. White.

For the Carlson organization, Roy and Fred H. Carlson were joint directors, and R. A. Chism was in charge of concrete paving.

Earth shoulders, which will later be seeded, will complete the picture. Myers Bros., Inc., is doing the shoulder work under a subcontract, using standard tractor-scraper and motor-grader equipment.

The Engineer as Builder Of Wartime Naval Bases

The branch of military science that deals with the transport, quartering, and supply of troops is called logistics. An important logistician is therefore the civil engineer and construction man who must build the wartime bases. At the February meeting of the Metropolitan Section of the American Society of Civil Engineers, members heard an interesting talk on "Construction, an Element of Logistics", by Rear Admiral A. D. Alexis, CEC, USN.

Admiral Alexis, who is Director of the Atlantic Division, Navy Bureau of Yards and Docks, N. Y., said that at the end of World War II, 90 per cent of our vessels of submarine and larger size were supported by 400 bases in the Pacific. The Bureau of Yards and Docks had to select and develop these sites. It based its choice on terrain: topography, water supply, and climatology. And it based its choice on ease of construction: availability of local materials and labor, and existing port, transportation, and communication facilities.

To give his hearers an understanding of the military construction mission, Admiral Alexis made three main points about base-site selection and construction. It is important to eliminate time-consumers, he said (these are harbor clearance, dredging, and large-scale grading). It is important to design for use of standard equipment. And the third important factor is flexibility—readiness to alter the Base Development Plan in the presence of new site knowledge.

We need more studies of portable emergency port facilities, he said. They are of primary military importance for quick port installation in captured areas and for roll-up (for re-use) of facilities no longer needed. They would also serve civil defense to get bombed-out domestic ports back into service.

White Has Parts Program For the Emergency Period

A plan to keep parts on hand in places where they are actually needed has been put into practice by the White Motor Co., Cleveland, Ohio. All White trucks in service in the United States have been registered, and the information gathered is the basis of a service-requirement analysis showing the location of each truck by serial number and model number, its age, and an estimate of parts needed and probable service-labor requirements. This analysis will be the backbone of White's emergency system.

As a part of the program, bulletins with the latest information on parts and maintenance will be issued to owners, as well as a special driver's manual. A directory of the more than 500 White outlets is also available to owners.

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Semi-Dump Trailer Has Novel Transfer

A unique transfer-type semi-dump trailer has been developed by Cook Bros. Equipment Co., 1815 N. Broadway, Los Angeles 31, Calif. The new Model TDS is a 2-axle semitrailer 32 feet long, with front and rear bodies capable of hauling 19 yards of aggregate or more, depending upon the weight of the aggregates. The company points out that this unit is particularly adapted to hauling lightweight aggregates which require large-volume bodies with loading space large enough to accommodate full legal loads of lightweight material. The trailer is mounted on a Cook Bros. Model C-12 truck-tractor with the hoist and transfer mechanism powered by a hydraulic pump on the truck-tractor. Control is effected by a single valve located on the trailer frame, which allows the entire operation to be controlled from the ground.

The novel feature of this unit is in the unloading. The unit is unloaded by first dumping the rear section of the body, then the rear body is lowered to admit the front body into it. The front body is powered into the rear body by means of a hydraulic transfer mechanism, and after dumping is powered back into road position and locked there by air-actuated pull-downs.

The frame is constructed of 1/4-inch high-tensile pressed steel with 8-inch front section, tapering to a 16-inch rear section, strapped top and bottom. The axles are of the tubular type with a 16,000-pound capacity. The hoist on the unit is the Model 174-T of 18-ton capacity.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 760.

Direct-Fired Units For Process Heating

A standard line of direct-fired heaters with capacities from 100,000 to 15,000,000 Btu per hour is manufactured by Struthers Wells Corp., Warren, Pa. This equipment is designed for a wide range of applications, including indirect circulating heating using heat-transfer mediums such as Dowtherm, and for direct heating of vapors and liquids. Temperatures range to 750 degrees F or above.

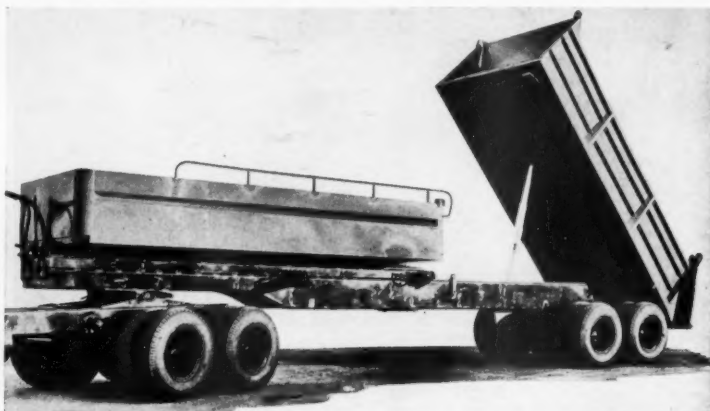
Automatic control systems and engineered systems including all necessary equipment are available if required. The heaters are intended for processes requiring heat at temperatures above the existing steam supply, or where operation may be improved or speeded up by higher temperatures. They may also be used to supplement existing boiler capacity, or for installation in remote plant locations.

Further information may be secured from the company by requesting Bulletin B-45. Or use the Request Card at page 16. Circle No. 778.

Gives Compaction Data On Pneumatic-Tire Rollers

A new broadside giving general and specific compaction data on Bros pneumatic-tire 35 and 50-ton Roll-O-Pactors has been announced by William Bros Boiler & Mfg. Co., Minneapolis 14, Minn.

The general compaction data consist of charts illustrating degrees of compaction (per cent of maximum dry density) for roller weights ranging from 12 to 50 tons on fill layers ranging from 6 to 24 inches. Data are obtained for 1, 2, 3, 4, and 5 compactor passes. Specific data are also provided on comparative results with pneumatic, grid, sheepfoot, and pneumatic vibrator-type equipment. These compaction-data tests were made by the U. S. Engineers at Mansfield Hollow, Lucky Peak,



The TDS semi-dump trailer mounts on a Cook Bros. Model C-12 truck-tractor. First the rear body is dumped, then the front body is powered into the rear body by a hydraulic transfer mechanism, and after dumping is powered back into road position and locked by air-actuated pull-downs.

Folsom, and Lookout Point.

In addition to the test data, there is information on the design and construc-

tion features of the Bros Roll-O-Pactors. Brief specifications are given for the Models 435 and 450, which vary in

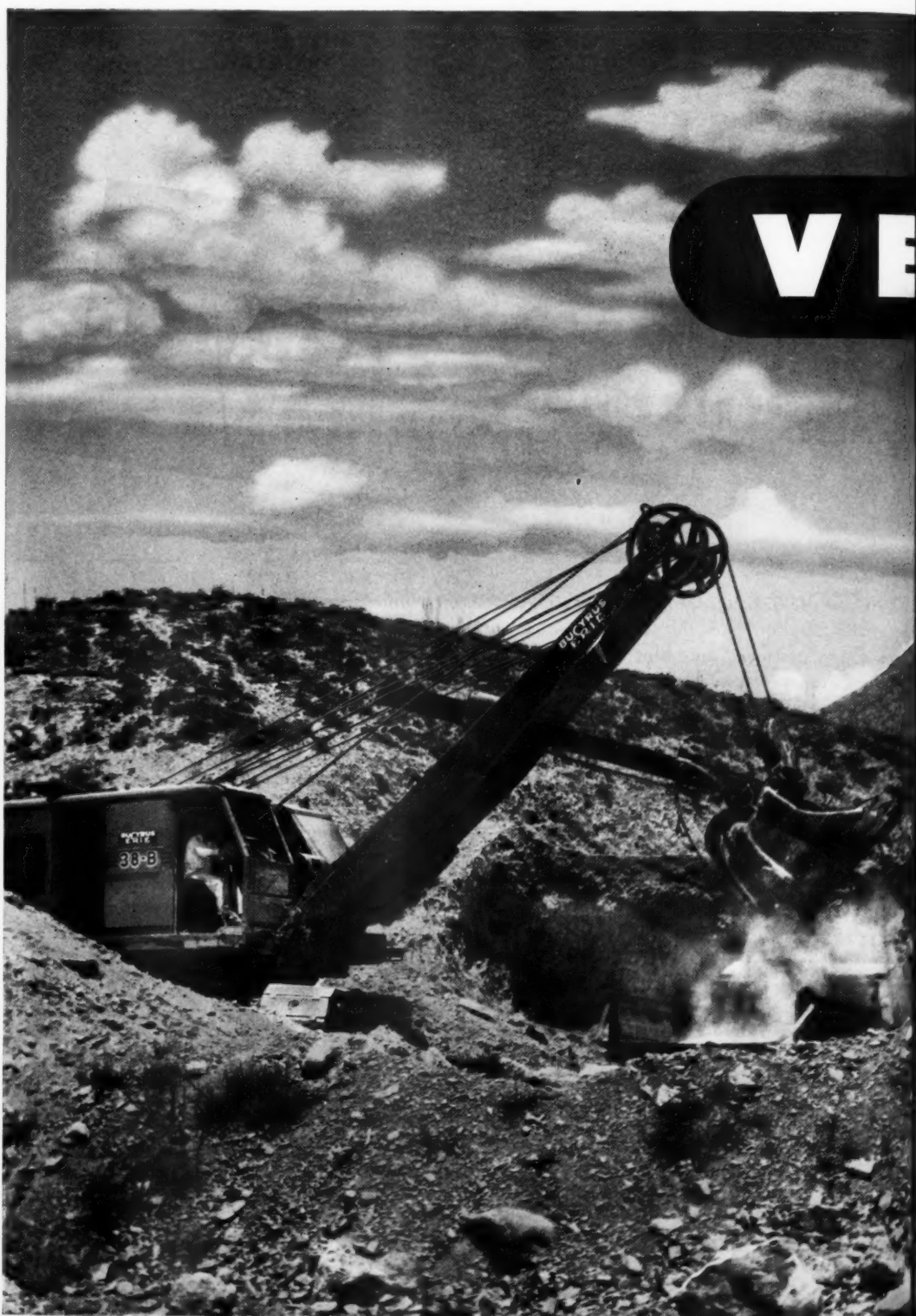
capacity from 10 to 35 tons and 20 to 50 tons, respectively.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 736.

DO-Rating for Maintenance

To obtain materials for the maintenance, repair, and operation of highways, highway departments may use defense order DO-97, according to an official of the National Production Authority. The order is part of the new MRO program set forth in NPA Regulation 4, dated February 27.

It does not specify highways as such, but it permits business enterprises and Government agencies to obtain limited quantities of maintenance, repair, and operating supplies. However, such supplies are limited in the second quarter to one-fourth the dollar amount spent for MRO purposes during 1950. It defines "Government agency" as "any of the 48 states or the District of Columbia, any political division thereof . . ."

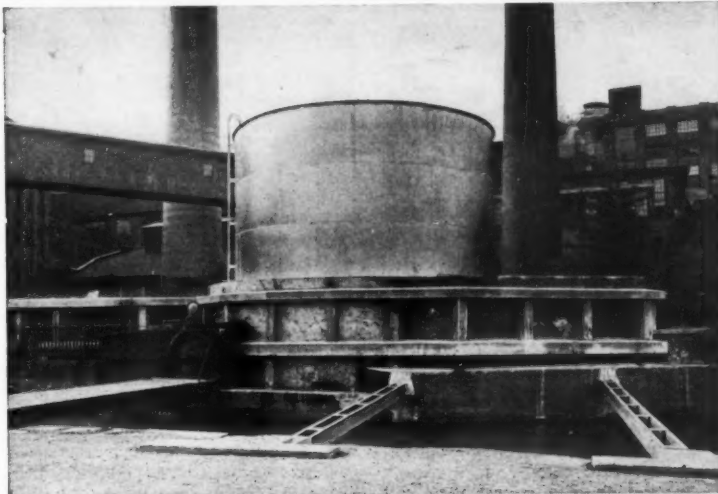


A Concrete Girdle Supports Dike Wall

An unusual concrete girdle resembling a huge link chain has been designed and constructed by Wigton-Abbott Corp. of Plainfield, N. J., to support a bulging half-century-old brick dike at the Johnson & Johnson surgical supply plant in New Brunswick, N. J.

The foot-thick irregularly shaped dike surrounds a fuel-oil tank on the banks of the Raritan Canal and rests on a 30-inch-thick concrete retaining wall on the canal side. This wall, because of frost action and the age of its lime-mortar joints, had begun to bulge toward the canal; the dike was no longer able to sustain emergency hydraulic pressure. The dike had to be reinforced, therefore, and the retaining wall supported to prevent further movement.

To reinforce the brick dike, two continuous concrete belts were formed entirely around the 212-foot perimeter of the dike wall. The lower belt, 23 inches wide and 16 inches high, was placed



A new concrete girdle resembling a huge link chain has been built by Wigton-Abbott Corp., Plainfield, N. J., to support a bulging half-century-old brick dike around a fuel-oil tank on the banks of the Raritan Canal in New Brunswick, N. J. Frost action and age had weakened the dike retaining wall on the canal side.

parallel to and approximately 11 inches above ground level. The upper belt, 19 inches wide and 12 inches high, was placed 5 feet above the lower one. Between the belts went concrete ribs at 5-foot intervals, forming a 5-foot-square grid support for the wall.

The irregular shape of the enclosed area made it necessary to tie in the girdle by concrete tie beams running across the width of the enclosure. These cleared the steel oil tank and divided the area into three roughly rectangular areas. After the concreting, the interior of the brick dike got a seal coat of 1-inch cement plaster.

To prevent further movement of the concrete retaining wall into the canal, two steel struts were placed across the 30-foot-wide channel and supported on the far side by concrete deadmen foundations. The struts were embedded in pockets cut into the retaining wall.

The old brick floor within the dike wall was regraded and overlaid with a new concrete floor sloped to carry off rain water to a drain line controlled by a 4-inch gate valve.

Warns That Controls May Sap Building-Industry Strength

The building industry is better prepared to meet defense-construction demands than it was at the start of World War II, but it faces serious dislocations as a result of unrealistic Government restrictions. This was the warning of Fred J. Driscoll, head of the New York contracting firm of George F. Driscoll Co., and recently elected President of the Building Trades Employers' Association, which represents 1,000 general contractors and subcontractors in the New York area.

Mr. Driscoll pointed to the backlog of demand for housing, hospitals, and commercial buildings. "It would seem reasonable," he said, "that until we are called on for an all-out war effort, such construction should be permitted commensurate with the present defense requirements for materials." He warned that unrealistic controls and restrictions would hamper the industry, disrupt its essential teamwork, and cause widespread unemployment. "We ask no special favors," he said, "but given the opportunity of keeping our teams together and working, the industry will be ready and prepared to meet emergency construction demands with unexcelled efficiency."

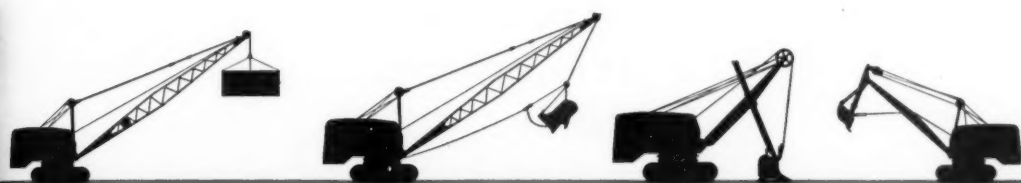
At the BTEA annual meeting at which Mr. Driscoll was elected President, Harry J. Stellmann, Vice President of Starrett Bros. & Eken, was elected First Vice President. Other officers are: Second Vice President, William Drew, Vice President of J. L. Murphy Co.; Third Vice President, Perry S. Dewey, President of the Employers Association of Roofers and Sheet Metal Workers; Treasurer, J. George Costello, President, Costello Concrete Construction Co., Inc.

High-Speed Generators

A 4-page bulletin on Tri-Clad high-speed synchronous generators is available from the General Electric Co., Schenectady 5, N. Y. Designated GEA-5470, the publication covers generators for standby, portable, and prime-source power in ratings from 1.875 to 50 kva with frequencies of 60 and 400 cycles. Four designs are described in the bulletin: externally regulated, self-regulated, and packaged-regulated 4-pole synchronous generators; and high-frequency 14-pole synchronous generators.

Illustrated with product pictures as well as cutaway and exploded-view photographs, the publication enumerates construction features of the new generators and includes a comparison table of ratings.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 766.



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Wet Weather Need Not Stop Heavy Equipment

With the rainy season upon us, here's some timely advice from R. G. LeTourneau field engineers on how to reduce equipment down time.

In anticipation of wet spells, keep your haul roads smooth with a dozer or scraper, and build ditches or culverts for adequate drainage. Watch smoothness and drainage in fill, cut, and borrow area, too. In the borrow area, load downhill in the direction of lines of natural drainage; eliminate ruts by smoothing the borrow pit or going from the borrow to the haul road over different routes. Rooters are useful for securing bigger loads in the borrow or cut area, but if it looks like rain, don't root material too far ahead of the scraper. Keep the area as solid as possible. Settle for smaller loads rather than shutting down entirely.

For good drainage, cuts should of course be low at the sides and high in the center. Fills should be high on the



Start back to work earlier after a rain by using a dozer to skim off mud and to drain and fill water holes.

shoulders and low in the center, and should be compacted as solidly as practicable by spreading in thin, even layers and changing the path of travel of each load. If it looks like rain, it's a good idea to smooth up the fill, cut, borrow pit, or haul road at the end of each shift. This can be done easily with a scraper by dragging the blade on the return trip or by back-blading with a dozer. It is also easy to cut a few ditches in rough, hilly country to keep water off the cut and fill.

After a heavy rain, send a dozer out ahead of other equipment to skim off mud, and to drain and fill water holes. Try wasting, stockpiling, or spreading out to dry, mud or materials too wet to go on the fill. If worth saving, this material can be picked up later a little at a time along with drier materials. This way, too much wet material won't be placed in the fill at any one time.

If showers have wet the top inch or so of the haul road and made it dangerous for rubber-tired units to work at top speed, spread sand or cinders or dry material over it in a thin layer. If the wetness has penetrated several inches, scrape it off with scrapers. Minimum grades also reduce slippage on a haul road and keep equipment moving at maximum speed. Soft spots should be patched by mucking them out and filling them with dry dirt from the cut.

It helps, too, to adjust tire pressures. Lower air pressure and lower speed can be used where conditions underfoot are soft and spongy to extended depths. Use higher tire pressures to cut through shallow mud to get to firmer footing.

Following these procedures before and after rain can do a lot to keep heavy equipment moving, "weather or not".

For Marion, Chicago and N. Y.

John C. Priest is a new sales representative in the Chicago district office of Marion Power Shovel Co. of Marion, Ohio. Kenneth A. Hanan is a new appointee on the sales staff of the New York City district office.

Concrete-Form Equipment

A 4-page circular on a full line of concrete-form equipment is offered by H. J. Krueper Co., 535 S. Clarence St., Los Angeles 33, Calif. Principal item in this line is the Taper-Tye concrete-form clamp, said to feature fast installation and adjustment, and to eliminate threaded tie rods and the twisting and unscrewing of rods embedded in concrete.

The literature reports that the clamp is easy to remove from concrete because of its taper shape. Compact grouting may be obtained by filling from the large end. No re-assembly is required at the bench after stripping. One rod, the circular reports, will tie up walls from 6 to 14 inches using standard lumber. Other types of form clamps, reinforcing-bar accessories, anchors, etc., are illustrated and described in the folder.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 759.



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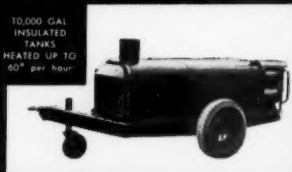


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AGC Reviews Problems In Present Emergency

Contractors at 32nd Annual Convention Are Advised What The Construction Industry May Expect in the Year Ahead

• **UNCERTAINTY** about the ultimate total volume of construction for 1951 was acknowledged at the 32nd Annual Convention of the Associated General Contractors of America, held in Boston, Mass., February 26 through March 1. The record high of \$28,000,000,000 in new construction last year may not be approached in 1951 because of the present emergency with its rising prices, material shortages, project restrictions, and limitations on manpower. Present and possible future Federal controls will influence the amount and type of work that will be undertaken in this country for some time to come.

Such was the consensus of spokesmen in the construction industry during the 4-day gathering of nearly 1,000 representatives of the 5,777 members of AGC. The association includes contractors in the three principal divisions of building, highway, and heavy-construction work. Newly elected officers of the group are Glenway W. Maxon, President, and Arthur S. Horner, Vice President. Maxon, a heavy-construction contractor, is President of the Maxon Construction Co., Dayton, Ohio. He succeeds Walter L. Couse, President of Walter L. Couse & Co. of Detroit, Mich. Horner is President of the Horner Construction Co. of Denver, Colo.

The keynote of uncertainty was struck at the opening session in the Statler Hotel when retiring President Couse predicted that the defense construction program will leave some areas of this country rather dry of work, thus forcing construction workers to migrate to other areas. He predicted more restrictions, regulations, tax increases, and renegotiation of government contracts. Because of the developing short supply of construction materials and equipment, Couse cautioned contractors in approaching new work to be sure of the availability of all materials required and the timing of their delivery.

National Emergency

Building construction has suffered most from Government action to control real-estate credit and prohibit the commencement of new projects, according to H. E. Foreman, Managing Director of AGC. In his annual report Foreman stated, however, that much of the loss in volume will be offset by new defense projects and facilities to increase productive capacity. As for highways, the report asserts they are more obsolete now for current needs than they were ten years ago. Airport construction under the Federal Airport Act has been limited this year to the projects most essential to national defense.

A substantial volume of railroad and other heavy construction is likely this year, with emphasis shifting from normal public works to defense construction. Reclamation construction is likely to fall off about 30 per cent, but the volume of flood-control and river-and-harbor work should not be cut as much unless Congress takes more drastic action than is expected. One result of an increase in the volume of defense construction is expected to be the use of more negotiated contracts.

Foreman sounded an ominous note when he told the contractors that they will be expected to furnish much of the equipment and personnel needed in the event of an attack on the United States. Heavy contractors are most likely to be called upon to perform necessary demolition and clearance work. The

AGC has submitted recommendations to the Federal civil-defense authorities on best uses of the industry's facilities in the event of disaster. While there is a potential market in the construction of bomb shelters and other public-works projects to be used for protection, this

program is still far from the construction stage.

Millard Caldwell, Civil Defense Administrator from Washington, spoke at the opening session. He admitted that "there are few shelters that are absolutely atomic-bombproof in the country today." Nor is there enough labor, time, steel, and concrete to build deep community shelters. Caldwell stated that an air attack could be made at any time on any American city with little or no warning, and that only about 100 seconds could be counted on in which to act "to save your life and the lives of your family". He recommended making the most of what we have, such as "reinforced-concrete buildings, the basement of your house, or a backyard shelter".

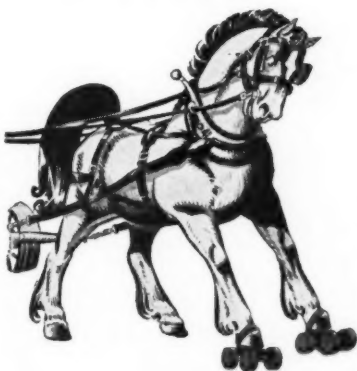
Construction-Equipment Outlook

A controlled-materials plan should be adopted by the National Production Authority as a guide in allocating materials to essential industry. Such was the recommendation of Ralph K. Stiles, 1950 Manufacturers Association, at one of President of the Construction Industry the general convention sessions. Stiles declared that shortages of critical materials, principally steel, were seriously hampering manufacturers of construction equipment in supplying the construction industry with the tools of its profession. The CIMA head, who is Executive Vice President of the Austin-Western Co., declared that many equipment manufacturers are actually faced with a slowdown, or a possible shut-

(Continued on next page)

No matter how you say it
It Comes Out the Same
Last Year—This Year—Next Year

in 1940
we said



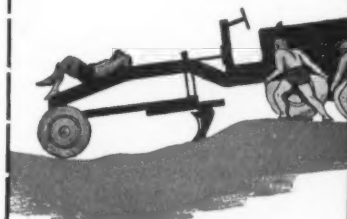
A motor grader without power on the front wheels is like a horse with roller skates on his front feet.

in 1945
we said

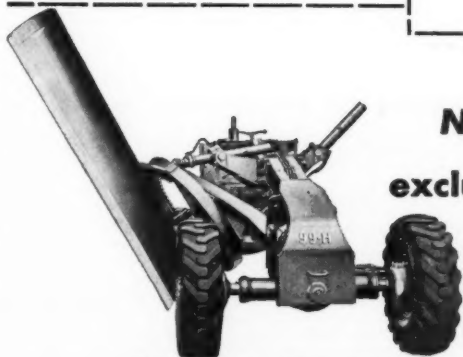


It's not in the cards for a grader with rear drive to equal the performance of one with All-Wheel Drive.

in 1950
we said



Don't handicap your horsepower! No grader with a dead front end can possibly deliver maximum power-at-the-blade.



No two ways about it! Austin-Western's exclusive All-Wheel Drive goes more places... does more things... moves more material, farther and faster.

AUSTIN-WESTERN COMPANY, AURORA, ILL., U. S. A.

BUILDERS OF ROAD MACHINERY
Austin Western
SINCE 1899

AGC Reviews Problems In Present Emergency

(Continued from preceding page)

down, due to their inability to obtain sufficient materials.

"Many are being forced to purchase material on the grey or black market", Stiles said. "Thousands of tons of steel in various forms are being imported from Europe at prohibitive costs, in an effort to keep going and hold manpower in place; all of this in face of the fact that more steel is being produced now than ever before in our history."

From a recent survey of construction-equipment manufacturers, Stiles reported on the status of various items of construction machinery, and their availability to the industry. According to this information, the Military this year may require 6,000 of the 8,000 motor graders that are manufactured annually. After this year the military demands would probably slack off to between 3,500 and 4,000 per year. Thus the number of motor graders for civilian needs would be far under the 1950 level.

Loaders are expected to be available for heavy construction in 1951, but the demand for pumps is heavy, with a large backlog of orders waiting to be filled. As to rollers and compactors, it is believed that the Military will absorb 50 per cent of the manufacturers' output, leaving the other 50 per cent for civilian use. The same 50-50 ratio will probably prevail with tractors, although the armed forces are buying the three largest models in sizable quantities. Scrapers will be in short supply to civilians, since manufacturers are unable to secure raw materials such as plate and structural stock.

As to power cranes and shovels in the ¾ to 2½-yard sizes, domestic users other than Government agencies will have available between 4,000 and 5,000 units during 1951 and again in 1952. In 1950 between 5,500 and 6,000 units were turned out. The production of excavators larger than 2½-yard size is expected to be stepped up to about 30 to 50 per cent above last year's output. Bituminous equipment will be in short supply because of armed-services purchases, and shortages of steel and all components. For some time the contractor will have to have his equipment before committing himself to any defense job.

The synthetic-rubber program is not up to expectations, but may reach full production by midyear. By then, with the increased imports of natural rubber, the industry should have adequate stockpiles for civilian and defense use. Off-highway trucks and trailers, it is estimated, will have 65 per cent of their production available for industry and civil construction, according to Stiles. The remaining 35 per cent will go to the Military by direct procurement, or for military operations performed by civilian constructors.

Controls Affecting Construction

Spirited discussion arose when the subject "Controls Affecting Construction" was presented by two Federal government spokesmen from the National Production Authority—Frank R. Creedon, Assistant Administrator for Facilities and Construction, and John L. Haynes, Director, Building Materials Division. Creedon pointed out (see also page 94 of this issue) that 35 per cent of structural-steel production is now going for the overall national defense program, leaving only 65 per cent for normal civilian demands. The situation is similar with other metals. However, from steel companies' estimates, Creedon predicted that steel production will increase a total of 13,700,000 ingot tons by the end of 1953. This will raise steel production in this country from a present yearly output of 104,200,000 tons to nearly 118,000,000 ingot tons. A corresponding expansion is expected in the

production of aluminum, with an increase from 761,530 tons, the present capacity, to 1,300,000 tons a year.

Creedon declared that the M-4 order of the NPA now in effect was necessary. At first prohibiting new construction in the field of amusement and entertainment, the order has been extended to include commercial projects for which a license must be obtained before construction is approved. The NPA spokesman ended on a brighter note, however, expressing the hope that, in the not-too-distant future, additional steel capacity will make it possible to discontinue entirely construction controls.

John L. Haynes, Director, Building Materials Division, said that the total dollar volume of construction this year would probably be off 2 to 3 billion dollars from last year's level of nearly \$28 billion. Hard hit in building programs will be schools and hospitals that were held up by material shortages in the last war, and by slow starts between 1945 and 1950. Haynes felt the country is in the worst shape for copper, and will be

for some time to come. He conceded that priorities may again be put in effect.

In the question-and-answer session that followed the formal statements, Creedon and Haynes attempted to clarify the particular problems of various contractors who were faced with unfamiliar situations arising from the present emergency.

Government Voices

Other spokesmen from the Army and Navy told the AGC group what their current programs included. Major General Lewis A. Pick, Chief of Engineers, Department of the Army, stated that for the fiscal year 1951, Army and Air Force construction would total \$2,400,000. Division and district engineers now have authority to approve the award of negotiated contracts for construction up to \$15,000,000 in value. This decentralization procedure is expected to speed up the emergency military program. The Chief of Engineers, however, must still determine when a cost-plus-fixed-fee contract is required. General Pick

reminded his audience that the entire civil-works program was recently reviewed, and that only essential projects are to be initiated.

The Navy has a current public-works and engineering program totaling nearly \$600,000,000, according to Rear Admiral Joseph F. Jelley, Chief, Bureau of Yards and Docks, Department of the Navy. It is believed that the majority of Yards and Docks contracts will be let on competitive bid. But Admiral Jelley warned that "if the material and labor markets get too bad, and contractors put in for exorbitant contingencies, we will have to go on a cost-plus-fixed-fee basis."

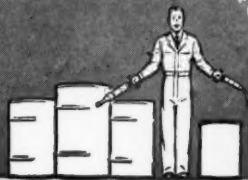
James A. Anderson, President, American Association of State Highway Officials, and Commissioner of the Virginia Department of Highways, asserted that during World War II entirely too many high-ranking persons assumed that our roads were expendable, and permitted excessive loadings. Materials, equipment, and manpower to keep high-

(Continued on next page)

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and guns!"



Now you can do all lubricating jobs just as well

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handle all your lubrication jobs. LITHOLINE converts servicing time into production time.

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- Smaller grease inventories
- Fewer dispensing units
- Less chance of contamination
- Less waste
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SINCLAIR

ways in condition were denied. The AASHO head emphasized that we have never recovered from those bad practices, and major highways are less adequate for today's needs than they were in the early part of World War II.

Division Meetings

On two afternoons of the convention the sessions were broken up into separate meetings of the three AGC principal divisions. In his national staff report to the Building Contractors' Division, Welton A. Snow, AGC Manager, admitted that the field or market for building contractors during this year is impossible to forecast as regards types of construction and breakdown of dollar volume. "However," he continued, "there is every indication of a sizable building construction program with emphasis on private industrial and types of construction related to the defense or war effort. Markets will change as new controls may be invoked. Undoubtedly builders will experience difficulty and delays in prosecuting nondefense work."



Glenway W. Maxon, right, takes the AGC gavel from retiring President Walter L. Couse, while new Vice President Arthur S. Horner looks on.

A. N. Carter, Division Manager, presented the national staff report to the Highway Contractors' Division which includes, along with highways, rural electrification work and airport construction. This group was addressed by A. C. Clark, Deputy Commissioner for Construction and Maintenance, Bureau of Public Roads, who declared that at this time "it appears fairly certain that there will be sufficient highway construction undertaken to keep the highway contracting industry busy for at least the next several months." The BPR official felt that during the present emergency emphasis will be placed on rehabilitation of the principal traffic arteries, and construction of access roads to installations and industrial plants important to the defense effort. While the Bureau of Public Roads has been designated claimant agency for all materials required for highway construction and maintenance, Clark pointed out that the Bureau has "no authority as yet to allocate materials nor to issue priority ratings to assist in obtaining them".

"The principal market for heavy and railroad construction will continue to be Federal appropriations and loans. The nature of much of the work, however, is changing from normal public works to defense work." Such was the forecast of J. D. Marshall, Division Manager, in his staff report to the Heavy Construction and Railroad Contractors' Division.

This group also heard an address by Grant Bloodgood, Chief Construction Engineer, Bureau of Reclamation, Denver, Colo. While refusing to hazard a guess on the reclamation program for the next fiscal year, Bloodgood said he believed that power development would hold top place in the program for the next fiscal year, but that no definite knowledge would be had until Congress acts on the President's budget. The latter is supposed to contain something like \$225,000,000 for the year's reclamation program, one-fourth less than was expended for construction in 1950. "Some time during the year to come", commented Bloodgood, "we are going to have to deal with price and wage escalation, priorities on materials, substitutions of materials, and many other headaches".

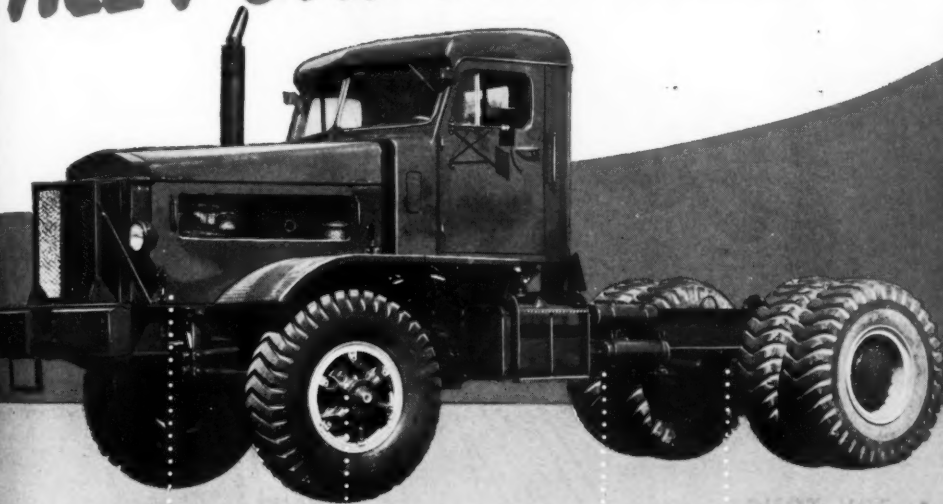
New division officers installed at the convention include: Building Contractors' Division—Chairman, H. C. Turner, Jr., President of Turner Construction Co., New York, N. Y.; Vice Chairman, W. Murray Werner, The Werner Co., Shreveport, La. Heavy Construction and Railroad Contractors' Division—Chairman, George Heller, Vice President of Johnson, Drake & Piper, Inc., Minneapolis, Minn.; Vice Chairman, Edward P. Coblenz, McLean Contracting Co., Baltimore, Md. Highway Contractors' Division—Chairman, E. J. Maupin, Jr., Dodge Construction, Inc., Fallon, Nev.; Vice Chairman, Frank W. Heldenfels, Jr., Heldenfels Bros., Corpus Christi, Texas.

Resolutions

At the concluding session of the convention, the Associated General Contractors of America went on record to ask the Office of Defense Mobilization and the National Production Authority to resurvey immediately orders prohibiting the further use of certain copper, brass, and aluminum products in construction. Such orders have a drastic effect on the entire economy of the country and the rearmament effort, was the unanimous resolve, and will seriously delay if not stop building projects. It is estimated that more than \$5,000,000,000 of building work will be delayed or stopped, thus causing serious unemployment of construction labor and great hardship, as well as immeasurable losses to the contractor, architect, engineer, and owner.

Modification or delay of the effective date of these orders was urged "to per- (Concluded on next page)

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Litholine stays put
in **WATER PUMPS**

WHEEL BEARINGS are safe with Litholine

Litholine for lasting **CHASSIS** lubrication

Litholine is top quality for **UNIVERSAL JOINTS**

LITHOLINE for every lubrication job

AGC Reviews Problems In Present Emergency

(Continued from preceding page)

mit the prompt completion of all buildings started prior to the issuance of these orders as well as essential industrial projects started since those dates; and further that critical metals be controlled at the production stage rather than by prohibiting the use of finished products."

When defense requirements make it necessary to award cost-plus-a-fixed-fee construction contracts, the convention requested that Government agencies, in determining the fees, give realistic consideration to the costs of doing business, to the nonreimbursable expenses of the contractor, and to equitable adjustment of the fee when scope of the work is increased.

The contractors opposed "valley-authority type of legislation" as a dangerous departure from our constitutional form of government and a threat to our private-enterprise system. Such functions should "be performed by qualified existing governmental agencies which are already established and whose activities are subject to regulation and control by our elected representatives in Congress and by the courts."

The AGC requested the Department of Defense to give realistic consideration to the rates which have been established in its document "Uniform Rental Rates for Contractor-Owned Construction Plant Under Cost-Plus-a-Fixed-Fee Contracts". Such rates are considered so low "that they do not compensate the contractor for his ownership expenses of equipment used on defense projects."

Where cost-plus-fixed-fee and lump-sum-guaranteed defense projects are under way in the same area, it was recommended to the Federal administering agencies that regulating wage rates, increased hours, and other factors be made comparable in both types of contracts.

New Sensitive Relays

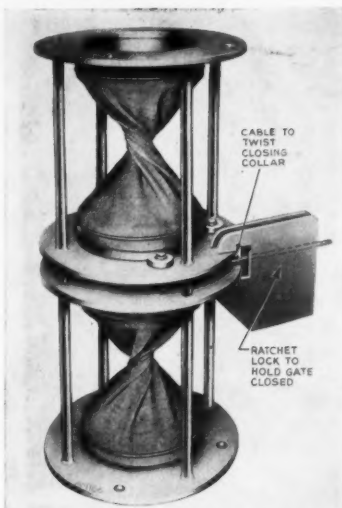
A new line of ac voltage-sensitive relays, of the power type, has been announced by Ward Leonard Electric Co., 31 South St., Mount Vernon, N. Y. These are intended for use in ac circuits where a close voltage differential between relay pick-up and drop-out is needed. Typical application is protecting ac motors up to 2 hp against damage caused by low line voltages. Other uses include power and lighting bus transfer and in some cases over-voltage protection. Operation is said to be chatter-free.

Further information can be secured from the company. Or use the Request Card at page 16. Circle No. 807.

Dust-Tight Valves

A new dust-tight and dribble-proof valve for closing off lump or fine materials (cement, sand, chlorides, or other admixtures) has been developed by Stephens-Adamson Mfg. Co., Aurora, Ill. The Twistite double-closure bin valve consists of two rubber sleeves joined by a rotating steel collar. Dust and drip-tight closure is obtained by pulling on a cable wrapped around the rotating collar, thus sealing the opening with a twist in each of the rubber sleeves. The valve is self-opening, since the rubber sleeves resume their cylindrical shape immediately when tension on the cable is released. Since the flexible rubber sleeves can wrap themselves easily around lumps caught in the valve during closure, there is no danger of leakage due to variation in the size of material particles, the manufacturer reports.

The Twistite valve can be hand-controlled locally by mounting a ratchet lock on the valve to hold the cable in



The Twistite bin valve closed, with its rubber sleeves held in a twisted position by a cable and cable-lock.

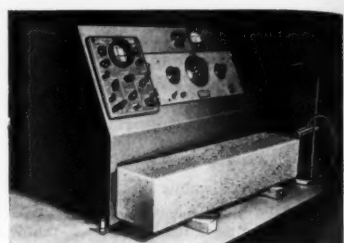
the closed position. Remote hand control can be obtained by mounting the ratchet lock at any desired location and running the control cable to it by a simple pulley arrangement. The valve can also be controlled automatically by the use of a small actuating motor.

The standard 6-inch valve weighs 35 pounds with the ratchet cable-lock mounted on the valve frame. It will handle lump sizes up to 2½ inches and requires a 30-pound cable pull for closure. Other valve sizes are available on request.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 717.

Young's Modulus E Measured by Sound

A new device for measuring Young's modulus of elasticity by sound vibrations has been developed by Electro Products Laboratories, 4501 Ravenswood Ave., Chicago 40, Ill., from a



The Electro Sonometer measures Young's modulus of elasticity—in aluminum, castings, steel beams, and similar materials—by sound vibrations.

basic design of the Portland Cement Association. The Electro Sonometer is used for determining the resonant frequency of any solid mass or material where strength is an important factor. Though basically a laboratory unit, semiportable Sonometers are also available.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 780.

Measure by

7½ to 79½ TONS
lift capacity

¼ to 2½ yards
dipper capacity

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Milwaukee 16, Wis.

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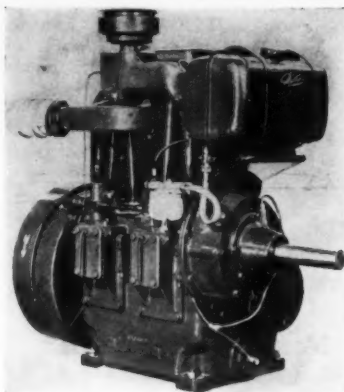
Air-Cooled Diesels

In 5 and 10-Hp Size

An air-cooled version of the Petter AV water-cooled diesel engine has been announced by Aboe, Inc., 350 Fifth Ave., New York, N. Y. Known as the AVA, it is available in either a single or 2-cylinder unit developing, respectively, a continuous horsepower of 5.25 and 10.5 at 1,800 rpm. Its bore and stroke is 3.15 x 4.33 inches. The single-cylinder engine weighs 390 pounds; the 2-cylinder engine, 550 pounds.

Full-pressure lubrication by a reciprocating pump is supplied to all main and large-end bearings. The rocker gear is force-fed lubricated. The aluminum-alloy piston is fitted with three compression rings and one scraper ring. The cylinder barrel is a one-piece centrifugal casting. Individual fuel-injection pumps operated by a common camshaft provide fuel under high pressure to a closed type of multi-hole nozzle. The nozzle breaking pressure is 2,500 psi.

The governor is a spring-type me-



Aboe's new Petter air-cooled diesel engines come in single or 2-cylinder models developing 5.25 and 10.5 hp.

chanical weight housed in the camshaft timing gear. A variable-speed control is available. Cooling air is provided by a centrifugal fan cast integrally with the flywheel. Deflectors direct the air where

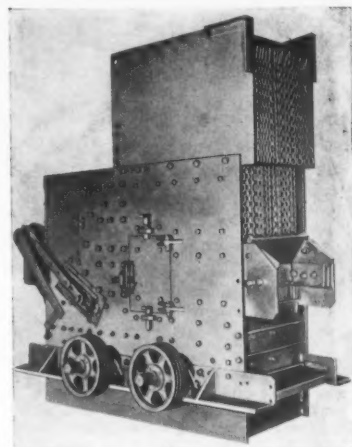
needed most. The ducting is easily detachable. Many of the parts are interchangeable with those of the water-cooled Petter AV models. The air-cooled engines retain the half-speed-drive features of the water-cooled models. In addition, there is a 1.62:1 overdrive gear for providing higher speeds necessary for centrifugal pumps.

Available with the air-cooled engines is a multiplate clutch that can be mounted either on the full-speed or half-speed power takeoff. Auto-Lite electric starting is optional.

Further information may be secured from the company, its distributors, or by using the Request Card at page 16. Circle No. 827.

New Sales Head, Wyeth-Scott

J. W. Brown, who has been Sales Manager of The Wyeth-Scott Co., Newark, Ohio, for the past two years, has been called back into the armed forces. W. E. Evans has succeeded him. Wyeth-Scott makes the More Power Puller.



The Model 3240 PMCO heavy-duty impact breaker has a reduction ratio between 32:1 and 40:1. It features "controlled impact action".

Heavy-Duty Breaker With Impact Control

A heavy-duty impact breaker, the PMCO Impact Master, has been developed by the Construction Equipment Division of Pettibone Mulliken Corp., 4700 W. Division St., Chicago 51, Ill. The Model 3240 has a ratio of reduction between 32:1 and 40:1. The breaker receives quarry-run rock up to 50 inches long that will pass freely through a 32 x 40-inch opening, reducing it in one operation. The machine has a rated capacity of 250 tons per hour of minus-2½-inch material in average limestone. In many types of rock, capacities of 125 tons of minus-1-inch are possible. Gasoline, electric, or diesel power sources with 125 to 150-hp range may be used.

The breaker features "controlled impact action", an operating principle which controls the breaking and directs the flow of material through the machine to produce a cubical aggregate of uniform gradation. The Impact Master consists of an outer plate-steel housing which forms a breaking chamber over two rotor-hammer members mounted in its base. The rotors have three rigidly supported hammers spinning on heat-treated alloy-steel shafts mounted on antifriction bearings. Both rotor hammers rotate in the same direction at speeds of 550 to 1,000 rpm. The size of the finished material is governed by the speed of the rotors, and by adjustments of a stripper bar and a lower screen grate, both of which are protected from damage by tramp iron with automatic-return spring-loaded safety devices.

The PMCO Impact Master is designed for use in open or closed circuits for producing aggregates for road building and concrete construction, and can be adjusted for the simultaneous production of aglime.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 826.

Repair of Tractor Parts

An informative circular about how to salvage worn tractor parts with Manganal applicator bars and welding electrodes is available from Stulz-Sickles Co., 134 Lafayette St., Newark 5, N. J. The folder points out that under today's conditions, repairing and rebuilding worn equipment is of the utmost importance.

Idle wheels rebuilt with Manganal bar electrodes frequently last longer than new ones, the catalog says. The Manganal special-shape applicator bars are designed to fit all types of worn tractor grousers. Manganal, the company says, practically eliminates build-up welding. It has a tensile strength up to 150,000 psi and work-hardens to 550 Brinell under impact and abrasion.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 743.

"KOEHRING WORK CAPACITY"

There's a BIG difference!
Ask your Koehring Distributor
for specific information



The Comet Clipper radial-arm saw has conveniently grouped controls, with an improved raising and lowering control handle in front of the work table.

Many Improvements On Radial Power Saw

Several new features have been added to the Comet Clipper contractors' saws manufactured by Consolidated Machinery & Supply Co., 2031 Santa Fe Ave., Los Angeles 21, Calif. The most important design change is the new control for raising and lowering the radial-arm column. This change, the company states, increases safety and the ease with which depth of cut can be adjusted.

Additional changes are a compact grouping of all saw controls, improved heavy oiled-felt wipers, and redesigned blade guard and sawdust chute. Both the guard and the chute are fully adjustable.

Comet Clipper radial saws are available in 2 to 5-hp models for 115/230, 230, 220/440-volt single or 3-phase operation, and will cut stock up to 4 3/4 inches thick. When equipped with a long arm, the Comet Clipper has a 25-inch cutoff capacity and will rip material to 35 inches wide.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 823.

Apprentice Training: Book Traces History

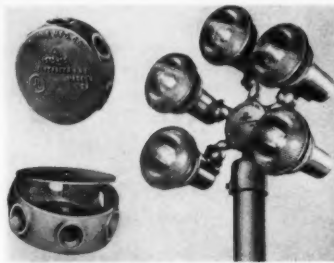
In 1832—118 years ago—a 16-year-old youngster named Lyman Slocum of New Bedford, Mass., signed an indenture binding himself as a carpenter apprentice to a master until he was 21. "During all which time" the boy agreed to serve his master "faithfully and well, his secrets keep, his lawful commands duly obey." He also promised not to "play cards, dice, or any other unlawful game; contract marriage; commit any acts of vice or immorality" nor "absent himself" from his master day or night, without his leave.

In return for the youth's services, the master agreed to provide him with "comfortable, and suitable clothing, board and diet, lodging and washing, and a set of carpenter tools". Except for the veiled promise that he would instruct the boy, or "cause to instruct" him in the "art, trade, or calling of house carpenter"—if he was capable of learning—there was nothing in the indenture on how the faithful apprentice was to be trained. The indenture does say, however, that he was to be allowed to go to school some of the time.

If the ghost of Lyman Slocum were to go on an industrial snooping tour today, he would be surprised at what a difference a hundred years make in the treatment and lives of the thousands of apprentices now in training in the construction industry in the United States. Present-day apprentices would be just as much surprised at what it was like to be an apprentice a century ago. And so would many of the skilled workers who have had the benefit of apprentice training as conducted under modern methods, as well as many contractors who are taking part in apprenticeship programs.

A comprehensive illustrated booklet entitled "Apprenticeship—Past and Present" discusses these points. It reveals not only the antiquated training methods used in very early days, but those in vogue during subsequent periods. Much of the information contained in this booklet should be of special interest to those participating in apprenticeship—representatives of management and labor, members of joint apprenticeship committees, as well as apprentices themselves.

Copies of this booklet, prepared by the U. S. Labor Department's Bureau of Apprenticeship, may be purchased at 15 cents a copy, by writing to the Superintendent of Documents, Government Printing Office, Washington 25, D. C.



The new Stonco weatherproof cluster lights for outdoor lighting.

New Outdoor Lights

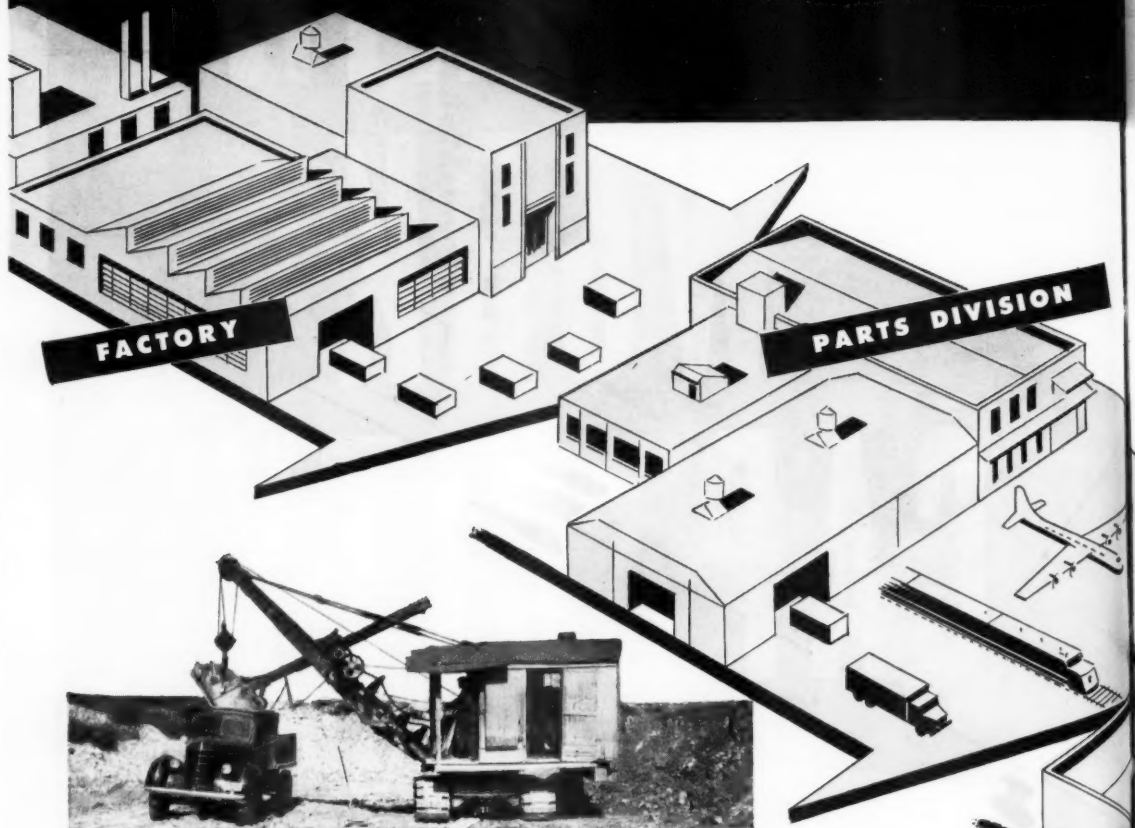
New weatherproof cluster lights for outdoor lighting have been developed by Stone Mfg. Co., 489 Henry St.,

Elizabeth 4, N. J. The new Stonco Cluster Box No. 25 unit is constructed of die-cast aluminum alloys. A removable cast-aluminum cover plate sealed with a heavy cork gasket provides easy access to inside wiring, and speeds up installation and the addition of supplementary lampholders.

Each box has six holes tapped 1/2 inch IPS to take from one to five lampholders for standard 150, 200, and 300-watt outdoor weatherproof reflector bulbs. Accessories immediately available include slip fitters for pipe mounting and brackets for wall mounting, although mounting directly to 1/2-inch conduit is made without accessories.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 719.

**97% OF LORAIN OWNERS ARE WITHIN
8 HRS. BY CAR OR 2 HRS. BY PLANE
OF A THEW-LORAIN PARTS STOCK**



NEVER AN "ORPHAN"—AT ANY AGE

Records show that for all Distributor's parts orders received, covering any and all models of Thew-Lorains, regardless of age, 81% of such parts are shipped promptly from the Parts Warehouse bins. . . . This is a remarkable record when it is considered that it includes orders for parts on machines 20, 25 and 30 years old. For example, recent shipments covered parts for a Type-00 Serial No. 2948 shipped in 1926; for a Lorain-75 Serial No. 3280 shipped in 1927; for a Universal Crane Serial No. 855 shipped in 1928. Frequently, to take care of these obsolete parts, special effort is required to run through a single piece . . . but it's all part of our policy that you can always get parts for any machine built by Thew-Lorain.

MONEY-SAVING PARTS "PACKAGES"

Among the parts your Thew-Lorain Distributor has available are a number of "package" items, consisting of commonly used parts. These "packages" contain all related and required parts for a replacement or change-over. Boxed as a unit, these "packages" are offered Lorain owners at special money-saving prices. Another Service—and another Saving you get when doing business with your Thew-Lorain Distributor.



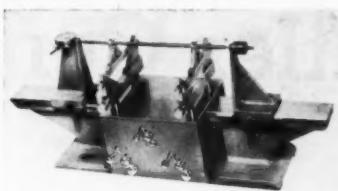
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A New Instrument For Concrete Labs

A Micrometer-Comparator for measuring contraction or expansion of concrete specimens was recently produced for the U. S. Corps of Engineers, Portland District, by Leupold & Stevens Instruments, Inc., 4445 N. E. Glisan, Portland 13, Oreg. Built to Government specifications, it will measure variations as small as 0.0001 inch. It is used to determine length changes of mortar or concrete specimens in connection with tests on chemical reactions, heat expansion, and resistance to weathering.

The Comparator consists of a cast-iron frame with a polished Invar steel gliding surface which is not affected by



The Micrometer-Comparator, built to Corps of Engineers specifications, determines contraction or expansion of concrete lab specimens to 0.0001 inch.

temperature variations. A bracket with attached dial gage reading to 0.0001 inch slides on one end of the Invar surface, and a bracket with a screw micrometer reading to 0.0001 inch is similarly mounted at the other end.

Two supports mounted between the brackets can be shifted independently to bring concrete samples to bear on the dial gage and micrometer gage.

Concrete specimens to be tested are molded with metal inserts embedded at each end. These metal inserts are lined up between the gage and micrometer brackets of the Comparator, and linear variations of concrete samples are determined with Invar steel reference bars of various lengths.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 735.

The careful selection and use of good lubricants at regular intervals will keep your equipment operating efficiently and economically.



The hinged platigrip fastener No. 500 serves wherever conveyor belts must be constantly added to, shortened, or shifted about.

New Hinge Fastener For Conveyor Belts

The hinged platigrip fastener No. 500 was developed by Armstrong-Bray & Co., 5364 Northwest Highway, Chicago 30, Ill., to answer the demand for a readily separable conveyor-belt splice in industries where loading or delivery points frequently change. It is designed to serve wherever heavy conveyor belts must be constantly added to, shortened, or shifted.

The fasteners are interchangeable with others of similar design; the plates can be intermeshed and used for direct replacement of a worn or damaged unit. The manufacturer reports that tensile-strength tests show an 18,000-pound capacity on a 30-inch belt. The multiple-unit design is said to give transverse flexibility and permit the belt to trough readily and operate smoothly. Embedding the plates in the belting assures a smooth-riding surface that will not damage pulleys, the company reports. The hinge pins have stranded-steel-cable cores under spirally wound steel armor. They are easily installed and removed. Pins are cut to standard lengths to fit all belts, and can be shortened as desired.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 782.

Estimates Its Road Needs

The Vermont State Highway Board has presented to the 1951 State Legislature a comprehensive report on local highway needs, based on a 2-year survey by State Highway Department engineers in cooperation with local officials and the Bureau of Public Roads.

The report shows that \$19,836,394 is needed to put town highways in good condition to serve the traffic now using them; this would improve 5,197 miles of road and 1,589 bridges. For 2,044 bridges which are now adequate but which will have to be repaired or replaced in the next 10 years, another \$4,479,488 would be needed.

The report also estimates that \$94,139,900 would bring Vermont's state highway system up to standard, and \$25,995,006 its state-aid system.

To help local officials, the Board also has prepared a 10-year program of town-highway improvements for every town, city, and village in Vermont, based on using the state's present town-highway appropriation for construction alone. This would require local governments to raise all maintenance money.

The Board has reached three major conclusions: (1) towns must raise more of their own money for highway purposes; (2) they must spend the state money for town-highway work more efficiently; and (3) it would be neither equitable nor wise to increase the present appropriations of state money for town highways, in view of the relatively greater needs of the state highway system.

IMAGINE!—never being more than 8 hours away from a source of Lorain parts... and in most areas east of the Mississippi, it's never over 2 hours. That's the kind of Parts Service offered you by the nationwide organization of Thew-Lorain Distributors. Most of these Distributors have the parts in bins waiting for you. Records prove that **97% of Lorain owners in the United States are never more than 8 hours**

by car from a Distributor's Parts Stock capable of filling **at least 70%** of their requirements right off the shelf... And this percentage would be much higher if it were not necessary to furnish obsolete parts for machines often 25 to 30 years old. Here's just another important way Thew-Lorain Distributors back up your machine and keep it on the job producing profits for you.

HOW WE BACK UP YOUR DISTRIBUTOR...

There's sound planning behind the reasons that enable your Thew-Lorain Distributor to give you such excellent Parts Service. It comes from the Thew policy that "Parts" are not a "side-line" or a "necessary evil". Instead, Thew has set up a separate "business" to run its Parts Division.

It has its own location
(Elyria, Ohio—10 minutes from Lorain)

It has its own buildings

It operates its own machine shop

It maintains its own warehouse

It is directed by its own management

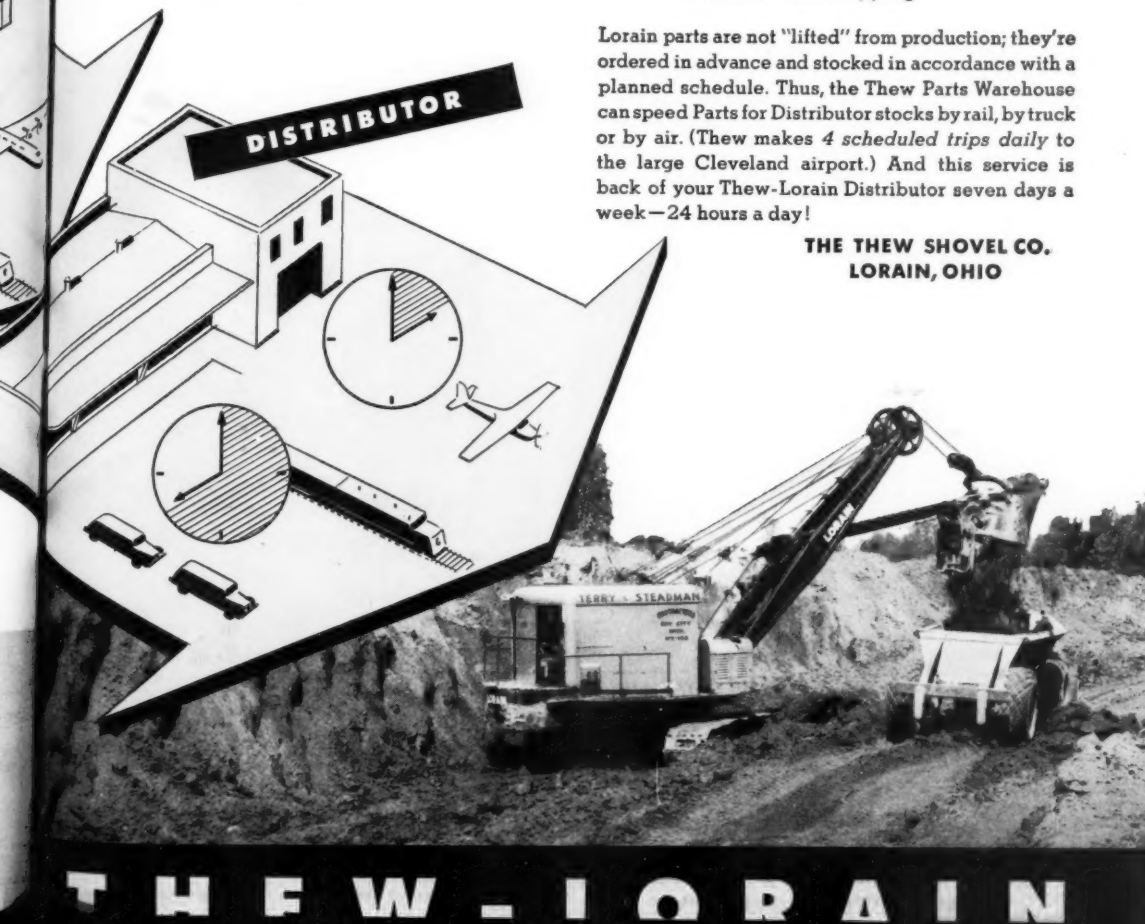
It does its own purchasing

It makes its own inspection

It handles its own shipping

Lorain parts are not "lifted" from production; they're ordered in advance and stocked in accordance with a planned schedule. Thus, the Thew Parts Warehouse can speed Parts for Distributor stocks by rail, by truck or by air. (Thew makes 4 scheduled trips daily to the large Cleveland airport.) And this service is back of your Thew-Lorain Distributor seven days a week—24 hours a day!

**THE THEW SHOVEL CO.
LORAIN, OHIO**



THEW-LORAIN

Huge Statler Center Rises



Here's the start of foundation and excavation work on the Statler Center, with demolition of the old Hoffman Building still under way.

• AMID reverberating rivet guns and the noise of power shovels, the Statler Center is beginning to rise in Los Angeles. Being built for Statler Hotels, Inc., at an estimated cost of \$22,000,000, it will give southern California the last word in hotel-office comfort. One of America's best-known building contractors, Robert E. McKee, has the approximate \$16,000,000 contract.

Of contemporary modern design, Statler Center will be breathtakingly beautiful. Designed by the Chicago architectural firm of Holabird & Root & Burgee in conjunction with Associate Architect William Tabler of Statler Hotels, Inc., Statler Center is to be framed in structural steel, with

Los Angeles Skyline Gets a New Height-Limit Building as Contractors Rush Steel and Foundation Work

By RAYMOND P. DAY,
Western Editor

spread reinforced-concrete footings and lightweight-concrete exterior. That exterior concrete is to be scored for a pleasing architectural effect.

Structure Is Immense

Statler Center will be immense. The entire building will house a hotel, office building, shops, and garage in its 14,000,000-cubic-foot space. On the 3-acre building site encompassed by Wilshire

Boulevard, Figueroa Street, Seventh Street, and Francisco Street, there will be 25 acres of floor space, made possible by the height-limit design.

Extensive use of lights and color will help to achieve tranquil simplicity, but there is also a set of architectural "brakes" to block monotony. Offset, horizontally sliding windows, for example, will break any possible monotony in the scored lightweight-concrete



This Browning rig handled the breaking of

exterior.

The hotel portion of Statler Center occupies 7,500,000 cubic feet of the 14,000,000-foot total. The hotel is to be one of the most modern in America. Its 1,275 rooms, with a total of 2,500 beds, will accommodate large conventions. All bedrooms are living rooms by day—in other words, bedrooms by day are luxurious lounges. The rooms will all be equipped with television, radio, and a canned music system.

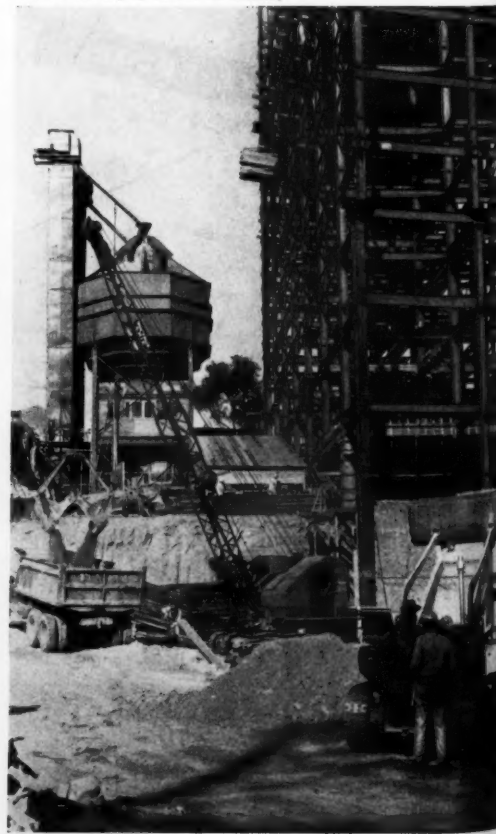
Three main entrances will serve guests. The main or "top hat and tails" entrance is on Wilshire Boulevard. A taxicab entrance will be located on Seventh Street. A special

(Continued on next page)

(Photos courtesy of Robert E. McKee)



Here steel erection is in progress, and the Johnson batch plant which will proportion lightweight concrete is set up.



A B-E 22-B loads excavation; a Traxcavator backfills.

On the West Coast



C. & E. M. Photos

As a surveyor checks levels across the building, workmen fine-grade a spread-type footing with hand shovels and a Chicago Pneumatic air spade (above). At right, above, a Whiteman power buggy dumps the first concrete.

motor entrance, where guests can drive in and leave their automobiles with motel convenience, will be located off the Francisco Street concourse. Guests can even register at the automobile concourse with direct elevator service to their rooms. The laundry alone would accommodate a city of 20,000 people.

Four large ballrooms, capable of accommodating 3,500 people, are strategically located. The main ballroom is to be equipped for telecasting. There will be 150,000 square feet of office space, 50,000 square feet of shopping center, and a 200-person bar.

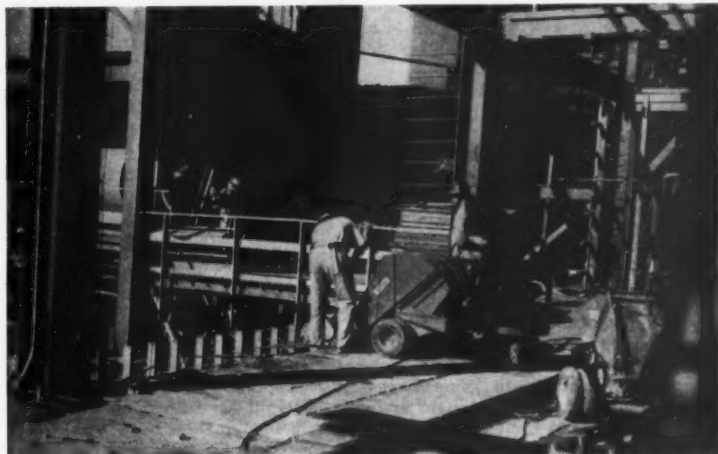
Paul Hoffman Building Razed

A part of the Statler Center site was occupied by a 30-year-old building three stories high, where the Paul G. Hoffman Studebaker agency was located. This building rested on concrete footings which had been designed for a height-limit extension to the building, so designing engineers thus had a rule-of-thumb check on their own foundation plans. But the building had to come down before construction could begin, and that involved the demolition of about 15,000 cubic yards of heavily reinforced concrete adjacent to busy Los Angeles streets.

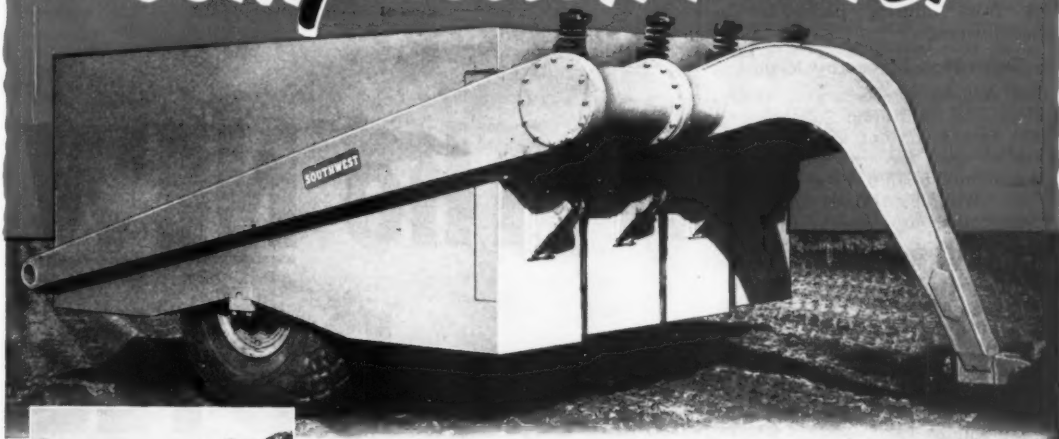
A demolition and excavation subcontract was let to C. G. Willis & Sons of Los Angeles, and Willis in turn called in Emsco Concrete Cutting Corp., a Los Angeles firm specializing in demolition work of this kind. How well Emsco reduced the building to rubble can best be told by saying that the entire job was done without a mishap, in spite of the necessity of occasional dynamite blasts, and the presence of a crane and breaking ball next to the busy streets.

The main demolition job was done by a 32-ton Browning truck crane, and a 6-ton steel breaking ball. The roof slab was broken up first, working the machine from the top of the building. A

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SOUTHWEST Compaction Roller



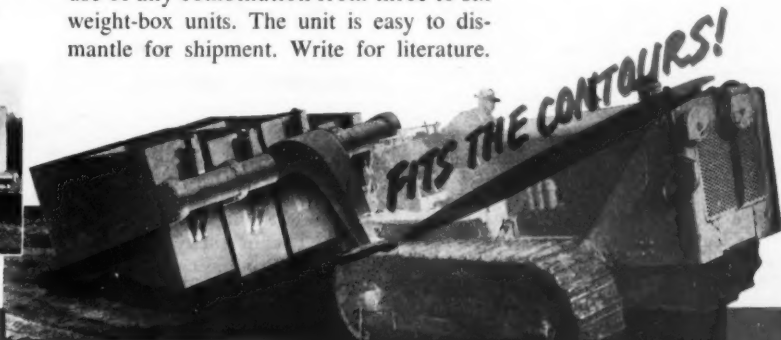
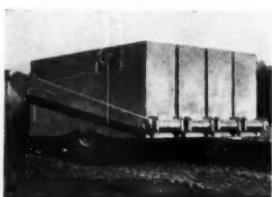
For compacting earth fills!

UNEVEN GROUND CONTOURS cannot reduce the efficiency of the new Southwest Compaction Roller. As it travels over the variable surface of the earth fill each weight-box unit with its own wheel and tire oscillates independently up and down. Compaction is positively uniform because the weight on each tire remains constant—there is no bridging and no sudden shifting of load from tire to tire.

The sectionalized tubular yoke permits the use of any combination from three to six weight-box units. The unit is easy to dismantle for shipment. Write for literature.

Note how every print of each tire tread is uniform in depth and shape.

The weight-box units are hinged at the rear and oscillate independently.



CONSTRUCTION MACHINERY DIVISION

Southwest Welding & Manufacturing Co.

Alhambra, California

HAULING SCOOPS BULLDOZERS LOADERS BOTTOM DUMP WAGONS RIPPERS TAMPERS SCRAPERS TREE DOZERS



**EXPERT
REPAIRS
All Makes**

**USED
INSTRUMENTS**
Bought and Sold

J. H. WEIL & Co.
1325 CHERRY ST., PHILADELPHIA, PA.
GURLEY DISTRIBUTORS

Huge Statler Center Rises on West Coast

(Continued from preceding page)

narrow strip of deck was left in place to strengthen the building sides as demolition progressed.

Rubble fell through to the next floor, where a D8 Caterpillar and its dozer scooped the material together. Strangely enough, the only near mishap occurred when one track of the D8 broke through the slab. The truck crane which weighed twice as much worked on the same slab without trouble. The floor slabs were systematically reduced to broken rubble, which was then front-end-loaded and trucked to a disposal site near Elysian Park. Three welders burned continuously to salvage the old reinforcing steel. The concrete in general was exceptionally sound and tough.

High columns at the exterior building lines were notched by the breaking ball near the floor. A cable was then fastened to each column, and a winch pulled them down. Bruce Sanger, Emsco's Superintendent, said, "Even then we had to break them up. The concrete was so tough it didn't break when the columns fell."

Most of the drilling and blasting was necessary to get the old footings out of the way. A small 105-foot Worthington compressor and a JB-55 Ingersoll-Rand Jackhammer did that work. Shots were always covered by heavy timber pads, to prevent flying rock from injuring passers-by or causing damage.

Excavation Moves by Night

Los Angeles streets are so traffic-glutted that Excavation Subcontractor Willis soon found out that the transportation cost for one truckload of dirt amounted to \$7, if it was attempted by day. With about 65,000 cubic yards of excavation to move in the main prism and some 250 footing holes, it was necessary for Willis to work much of the digging by night.

A Koehring 801 shovel moved in for a 10-hour night shift, loading a fleet of 27 dump trucks. There was an elevation differential of 38 feet between extreme corners of the structure, and since 3,000,000 cubic feet of Statler Center will be below ground level, a large hole in the ground was contemplated.

Excavation moved down in a series of 12-foot benches, with an access ramp left on the southwest corner. Material varied a great deal. Exceptionally hard-packed sand was found, there were a few clay pockets, and some hard rock was encountered. The latter formation was far down in the footings, however.

Excavated material was hauled to Cravez Ravine, and dumped approximately 3½ miles from Statler Center.

When the large shovel finished, a Bucyrus-Erie 22-B and a B-E 15-B moved in for the cleanup. The 22-B, rigged as a dragline, pulled excavation out from between the old footings so Emsco's men could break them up. Later on, the 22-B, rigged with a ¾-yard Owen clam, gouged out many of the 250 footing holes.

The 15-B worked most of the time with a shovel boom and dipper stick. It could dig a 6-foot hole easily, especially in the typical bottom section. Minor ground water made its appearance near the bottom, but it was pumped over to a main sump, settled until it was clear, and then transferred out of the area to a nearby storm sewer. Where rock was found, it was removed by breakers. A clam-shell then took it out.

As excavation exposed the old Hoffman Building foundation sides below ground, they were protected from falling in by heavy wood-pile shores, interposed on an approximate 45-de-

gree angle from the concrete back to kicker holes in the ground. The hard sand showed no appreciable tendency to cave, however, and steep, vertical sand walls left exposed for several months failed to ravel even when shooting was done nearby.

McKee Builds Footings

Many major items, including concrete work, are being done by crews of the Robert E. McKee organization. Actual field operations, and the coordination of work of various subcontractors, is the responsibility of J. L. Morris, General Job Superintendent for McKee. Working under District Manager Lamar Wilson, is C. C. Wright, Project Manager. Morris has as his top assistant R. L. Lee.

One of the first jobs for McKee is the construction of the numerous reinforced spread footings, as soon as Willis uncovers the site. Conventional methods are being employed. Plywood-faced form panels are built in a central carpenter yard, installed and checked,

and then filled with steel reinforcement and truck-mixed concrete. The firm is spending \$60,000 to set up a 600-cubic-yard Johnson semiautomatic batch plant on the site. It will hold enough material so it can be charged largely at night. Mixing and placing the lightweight-concrete siding will be an interesting story, but it will be farther along in 1951 before CONTRACTORS AND ENGINEERS MONTHLY can detail that work.

Structural Steel Rises Fast

One of the most spectacular operations so far is the erection of heavy structural-steel members. Already, Los Angelinos are rubbing their eyes in amazement at the speed erection crews are showing. With an estimated completion date of 1952, the erection of structural steel is about a week ahead of schedule. The 7,125-ton job is under the personal supervision of J. J. Yates, Erection Superintendent for southern California for Consolidated Western Steel Corp.

The structural steel is actually somewhat of a joint venture. American Bridge Co. is fabricating about half the tonnage. Consolidated Western Steel Corp. is fabricating the remaining half, and handling all the erection.

Yates is handling the structural erection with four guy derricks. Each derrick has a 100-foot mast anchored with 6 guys, and a 90-foot boom. Llewellyn, American, and Clyde hoists on the 4 derricks are driven by 50 and 75-hp electric motors. In addition to these machines, there are two ground cranes to unload material and do miscellaneous hoisting. One of these ground machines is a 25-ton Lorain Moto-Crane with 70 feet of boom and a 30-foot jib. The other is a Bay City 20-ton rig, with 70 feet of boom and a 20-foot jib.

To maintain his schedule, Yates finds it necessary to erect 35 tons of steel per derrick per day. So far, the machines have not only done that, but one day they averaged 88 tons.

(Concluded on next page)

ANNOUNCING...

The NEW SHELL ROTELLA OIL (Extra Heavy Duty Type)



"... exceeds every accepted performance standard for oils in its class"

OUTSTANDING PISTON CLEANLINESS

The new Shell Rotella Oil stands out in the very top bracket with respect to Piston Cleanliness, providing convincing proof of its ability to keep contaminants out of the critical zone in which wear is concentrated.

MUCH LOWER RING DEPOSITS

Ring-plugging tests are really tough, yet new Shell Rotella Oil came through stiff competition with a remarkably low ring deposit rating... far below the established passing mark!

GREATER ENGINE LIFE

Recognized laboratory engine tests are important in establishing qualifications of lubricants to meet strict requirements. More important to operators, however, is the tremendous increase in engine life and the consequent reduction in maintenance expense and time out-of-service that the new Shell Rotella Oil is contributing to fleet operation under today's conditions.

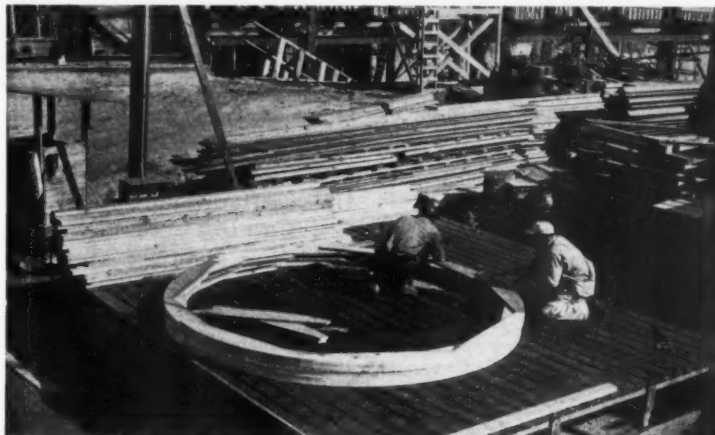
NEW

SHELL ROTELLA OIL...

Strangely enough, that was on a muddy, rainy day.

Working space is so limited that there is no room to store structural steel, beyond possibly a few truck-loads. So Yates orders each day from the Los Angeles plant, and as the material arrives on the job it goes up, often without any secondary handling. Some of the main uprights are heavy: 18-inch 400-pound members are occasionally handled. "But structural design is certainly different than it was 25 years ago," Yates said. "Buildings are stronger now, with less tonnage."

In general, the guy derricks set two floors before making a jump. Yates' crew can jump a derrick two floors in 4 hours. The derrick rests on two jumping beams, with 3-floor cribbing to take the load. In making a jump, the derrick boom is hoisted first, tied off, and used as a gin pole. The mast and swinging circle is then hoisted up through the jumping beams, which are moved back together after the mast makes the jump.



C. & E. M. Photo

Carpenters on the Statler Center job work in this central yard to prefabricate most of the intricate forms.

About 85,000 rivets will have to be heated and driven before the job is finished. Yates is using 8 riveting gangs. Each gang gets an average of 250 rivets in an 8-hour shift. The rivets range in size from $\frac{3}{8}$ to $1\frac{1}{4}$ -inch.

Structural-steel erection, in fact, seems to be setting the pace for the rest of Statler Center.

By 1952, many a traveler will be looking forward eagerly to a trip to Los Angeles, for it will mean a stay in one of America's truly outstanding hotels.

Refresher on Cableways

When and how to use cableways was J. G. Tripp's topic at the Winter Convention of the American Society of Civil Engineers in Houston in February. Mr. Tripp, a consultant on construction-plant problems, told the delegates, among other things, that heavy-duty spans of over 2,700 feet are uneconomical; that a standard 25-ton cableway can handle a 400,000-cubic-yard job provided it covers the work, by servicing the job during one shift and pouring during two; and that another cableway should be added for each increment of 400,000 cubic yards.

Mr. Tripp reviewed the parts of a cableway. Track cables, he pointed out, may be attached to stationary anchors, moving towers, stationary masts, or a combination. On long spans, they may be up to $3\frac{1}{4}$ inches in diameter. Power may be applied by two hoists at the towers or masts, or by a self-contained unit on the carriage itself with the operator riding the carriage. Most cableways operate on a single-track cable, but where they operate on multiple-track cables, they should have self-contained power units.

Cable carrier frames help control sag in travel cables, said Mr. Tripp. These are alternately stored and removed from the horn on one end of the carriage as it travels forward and back. A button line is required to space the carriers—the horn plows up the carrier units from the track cable as the carriage runs into them, and the button pulls them off as the carriage recedes. The operating lines run through sheaves in the carriers.

At Shasta Dam, a 466-foot-high pivoted headtower handled seven radiating cableways, Mr. Tripp told his audience. It was anchored 100 feet deep in bedrock to withstand the one-sided pull of the cableways; over 4,000 tons of structural steel went into it. The cableways handled 18,500,000 tons of concrete during the 1940-44 building of the dam.

"Costly as it is," said Mr. Tripp, "cableway equipment has long life. Parts of original rigs built for dams constructed over 40 years ago are still in use, patched up but still in use." The man who will be in charge of the operation when the rehabilitated rig is set up should be the lead man in inspection, overhaul, erection, and operation, Mr. Tripp advised.

Automatic Batcher—110 Tons

The clean line and simple operation of the automatic Conveyco batcher are highlighted in Bulletin 140 prepared by The Conveyco Co., 3260 E. Slauson Ave., Los Angeles, Calif. One $1\frac{1}{2}$ -hp electric motor operates the interlocking quadrant bin gates through cams mounted on a single shaft; there is only one relay in the entire mechanism.

Cross-section front and side views illustrate the simple outline of the batcher. The unit requires a base area of $17 \times 18\frac{1}{2}$ feet. An 8-foot-high and 10-foot-wide truck clearance is possible. The catalog points out that the overall height of 26 feet 4 inches enables feeding with a 40-foot-boom crane; this crane can also erect the Conveyco, since the heaviest of the four units weighs only 6 tons. Full capacity of the 4-bin compartment is 110 tons. Other features and illustrations of the unit are included in the folder.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 756.

Stepped up cleaning action... Even greater anti-wear protection

... anticipating the needs of today's high performance fleet engines

TODAY'S hauling conditions are imposing greatly increased demands upon fleet engines... and the lubricants selected to keep them running. At the same time these high-performance engines are expected to turn

in ever-increasing mileage records between overhauls.

For these reasons, and because even greater performance will probably be expected as time goes on, the detergent-dispersant and anti-wear qualities of Shell Rotella Oil have been markedly increased.

Operators using Shell Rotella Oil in the past will find an even greater latitude in maintenance procedures.

4-WAY LIFE EXTENSION FOR BUSY ENGINES

1. Remarkable detergent-dispersant action

The ability to suspend contaminants has been deliberately stepped up in the new oil. Field tests on vehicles, in widely varying kinds of service, prove conclusively that this greater detergent-dispersant action extends mileage between overhauls.

2. Drastic sludge reduction

Operators who have been having sludge troubles... with clogged pump screens, burned out bearings, or clogged oil ways... are urged to find out for themselves how remarkably clean those engines will remain while using this new anti-sludge Shell Rotella Oil.

3. Positive Anti-acid action

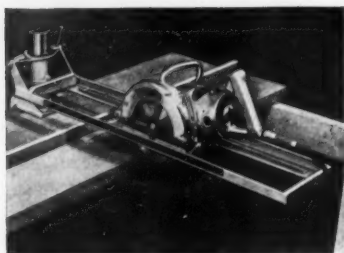
New Shell Rotella Oil directly counteracts the acid action of fuel combustion products in the vital top-cylinder zone... with correspondingly great reduction in wear. This protection is extremely important in the operation of intermittently loaded engines.

4. Extends time between engine overhauls

New or reconditioned engines... operating on fuels of widely-varying quality... in all kinds of fleet service... have demonstrated an important extension of in-service time. This gain results from improvement in several basic respects: freedom from sludge and ring-clogging, increased valve life and greatly reduced wear.



for all heavy duty fleet engines



Latest arrival in the Skilsaw line—a saw guide which converts a portable electric saw into a portable radial saw. It weighs 26 pounds.

Portable Saw Guide

A portable saw guide which quickly converts a portable electric saw into a portable radial saw is now marketed by Skilsaw, Inc., 5033 Elston Ave., Chicago 30, Ill. Weighing 26 pounds, it is easily attached to a small platform on two sawhorses, the company says. By simple adjustments, cross-cuts, bevel cross-cuts, miters, bevel miters, rips, and bevel rips may be made.

For use with Skil Saw Models 77, 825, 87, and other makes with a base width capacity of $4\frac{1}{8}$ to $5\frac{1}{2}$ inches, the saw guide has a radial range of 60 degrees right or left and a bevel capacity of 45 degrees. Maximum cutoff capacity is approximately 17 inches and the maximum ripping width is approximately 28 inches.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 831.

Electric Chain Hoist

A new Type JC electric chain hoist in $\frac{1}{4}$, $\frac{1}{2}$, and 1-ton capacities has been placed on the market by Robbins & Myers, Inc., 1934 Clark Blvd., Springfield, Ohio. It is equipped with simple rope controls, is designed for hook suspension, and is constructed of high-strength cast-aluminum alloy with heat-treated gearing and high-carbon or alloy-steel ground shafts. The entire gear train is enclosed in an air-tight case and operates in an oil bath.

Relatively light in weight, the unit is easily transported and shows its versatility in all types of applications, the company claims. A link-type steel chain is designed to provide a natural flexible lift and safe dependable hoisting operations. This chain is single on the JC-15 (500-pound capacity) and JC-110 (1,000-pound capacity); it is double on the JC-120 (2,000-pound capacity). The hoist can be adapted to any length of lift, depending upon ceiling height or lift required, by adding necessary lengths of chain and control ropes.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 791.

Stud-Welding Power Units

Detailed specifications and performance characteristics of two Nelwelder power units for stud welding are described in a 4-page bulletin issued by Nelson Stud Welding Division, Morton Gregory Corp., Lorain, Ohio.

One is a small compact power unit which, according to the report, gives stud-welding performance equivalent to two conventional 400-amp generators in parallel. It can be used to weld studs up to and including $\frac{5}{8}$ inch diameter. The other is a battery unit with a self-contained automatic charging device, which operates from any 110-volt ac outlet. Especially useful where power is not available for operating motor-driven welding generators, this unit welds studs up to $\frac{1}{2}$ inch and can be transported by trailer. Specifications, features, and illustrations of each unit are provided.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 767.

Hwy. Dept., M. I. T. Engage in Joint Research

The Massachusetts Department of Public Works and the Massachusetts Institute of Technology have linked up to do experimental research on highway and bridge construction. Committees from the Department and the Institute will meet regularly to determine a research and study program. M. I. T. will set up a special laboratory for experiments and for analyzing materials new and old. The scope of the project is suggested by the fact that the agreement signed by M. I. T. President Killian and Commissioner Callahan gives patent rights to M. I. T., the royalty funds to be used for public benefits.

M. I. T. engineering students will study problems in laying out highways and building bridges, and will follow the projects through to completion. Regular courses will also be held for the

state engineers to keep them up to date on new developments and techniques in engineering. The Boston Central Artery will be one of the first studies, and many new ideas will be tested for inclusion in the construction plans. The State will contribute \$30,000 as its share of the program cost.

Unique Hydraulic Loader Can Dig at Front or Rear

A 4-page folder and specification sheet on the Strait-Line hydraulic loader, which can operate as a standard front-end shovel or overhead loader, is available from Maine Steel, Inc., 169 Front St., South Portland, Maine. Designed for mounting on the Oliver 77 wheel tractor, this unit will dig in either the front or rear, but always dumps in front. It is said to combine traction, easy steering, streamlined operation, and complete mobility.

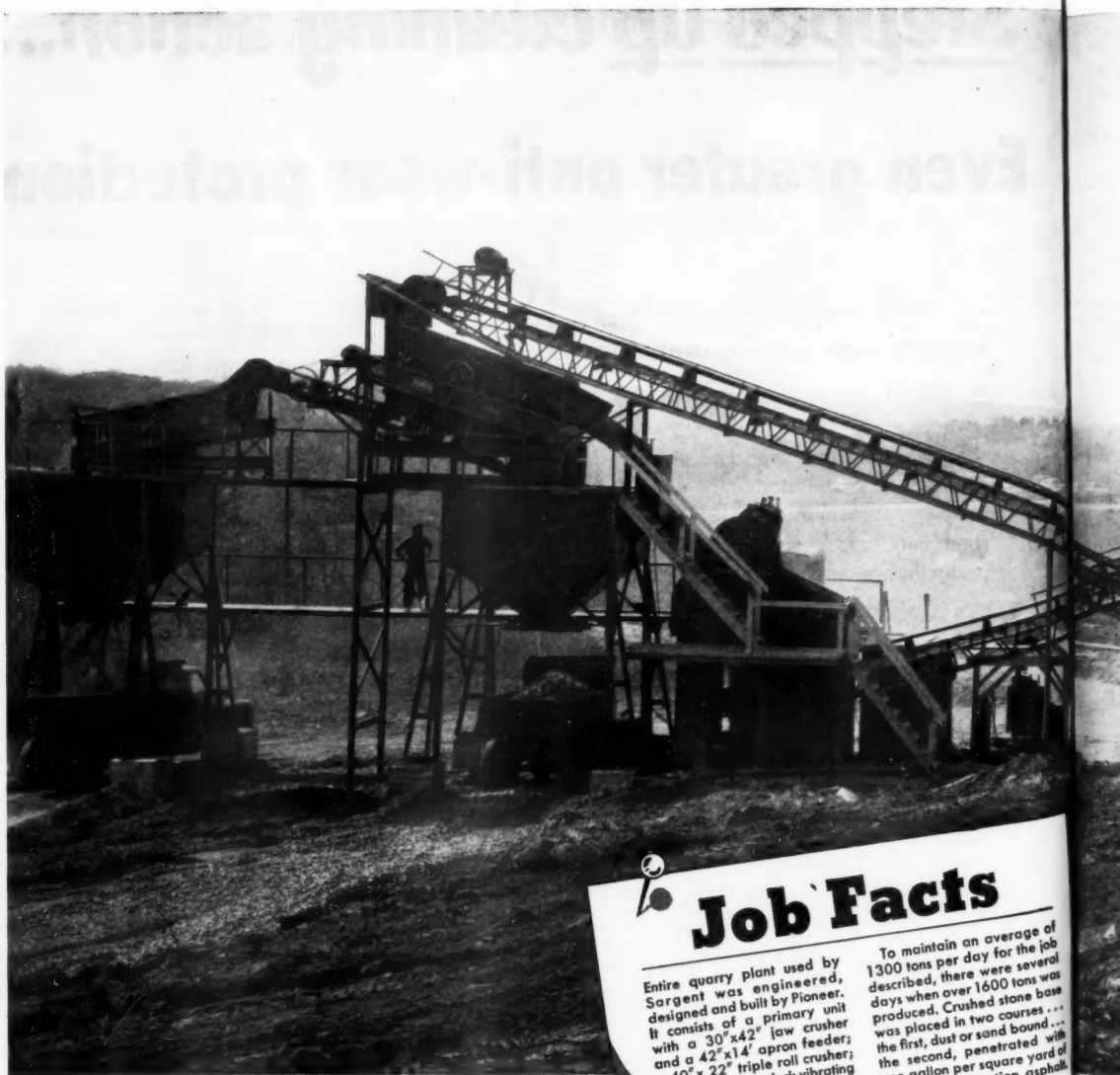
Each of these points is discussed in detail and illustrated with on-the-job photographs and with cross-section diagrams of the digging action. Data on the weight distribution obtained in rear digging illustrate the traction and steering features of the unit. Complete specifications and dimensions on the bucket, hydraulic equipment, tractor, and frame are included.

Dual photographs show how the bucket-tilt index enables the operator, without looking at the bucket, to position it at the correct digging angle. Sideboards may be mounted on the bucket to increase its struck capacity from $\frac{1}{2}$ to $\frac{3}{4}$ cubic yards. For simplicity in control, two levers are used to operate the Strait-Line; one lifts and lowers the arm and the other tilts and trips the bucket.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 754.

When you're racing time...

that Pioneer Edgewood



Job Facts

Entire quarry plant used by Sargent was engineered, designed and built by Pioneer. It consists of a primary unit with a 30"x42" jaw crusher; a 42"x14" apron feeder; a 40"x22" triple roll crusher; a 4'x10' three deck vibrating screen; two 20 yard bins and 95' of conveyor.

To maintain an average of 1300 tons per day for the job described, there were several days when over 1600 tons was produced. Crushed stone base was placed in two courses... the first, dust or sand bound with the second, penetrated with one gallon per square yard of 85-100 penetration asphalt.

BUY BOTH!

HIGHER OUTPUT
LOWER UPKEEP

Pioneer

Continuflow EQUIPMENT

Plaster-Mortar Mixers. Tilt and Non-Tilt Models

A new 8-page catalog contains the latest word on the 6-cubic-foot tilting and non-tilting plaster-mortar mixers made by Kwik-Mix Co., Port Washington, Wis., a subsidiary of the Koehring Co. of Milwaukee. It also covers the 10-cubic-foot non-tilting model.

The catalog stresses the labor-saving power tilt of the 6-cubic-foot end-discharge model; the loaded drum is tilted for discharge by power from the paddle-shaft drive action when the ratchet lever is released. It explains the easy-handling features of the 6-cubic-foot side-discharge mixer, including a toggle lever for operating the wide discharge door and the telescoping axle which reduces mixer width to 33 inches to clear interior doorways.

The 10-cubic-foot model for high-volume production has a push-down

tow pole, a low charging height, a toggle-operated drum drain, and anti-friction bearings throughout. Electric power is optional on all models.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 80.

Concrete Protection

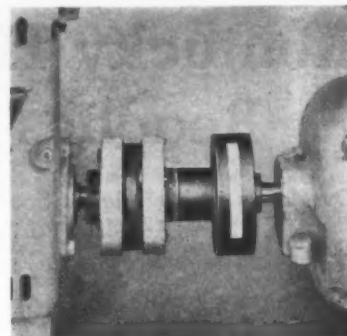
One of the more recent uses of Sisalkraft is as a blanket between the sub-fill and base slab of a basementless building. According to literature released by The Sisalkraft Co., 205 W. Wacker Drive, Chicago 6, Ill., such a blanket prevents loss of water and cement into the sub-fill, thus maintaining the concrete density intended; it eliminates the formation of concrete "fingers" which penetrate the voids in the sub-fill and draw up ground moisture by capillary action; and it saves concrete.

The circulars also describe the use of Sisalkraft to protect and cure floor and road slabs, to protect material and equipment against weather, and to close in buildings. One of the circulars points out that Sisalkraft has more than a half mile of closely spaced cross-laid sisal fibres per square yard. The available sizes in rolls, blankets, and covers are listed.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 716.

Shunk Promotes Newkirk

J. D. Newkirk is now Assistant Sales Manager in charge of all customer relations for Shunk Mfg. Co., Bucyrus, Ohio. Mr. Newkirk, who came to Shunk almost two years ago, was previously in charge of distributor liaison for the Fruehauf Trailer Co. and the Thew Shovel Co.



The new Mercury clutch coupling allows for mounting of a standard flexible coupling on the shafts of electric motors up to 15 hp.

New Clutch Coupling

A new clutch coupling has been placed on the market by The Mercury Clutch Division, Automatic Steel Products, Inc., Canton 6, Ohio. It is a complete unit consisting of a Series E Mercury clutch with provision for mounting a standard flexible coupling between it and the driven load. It is designed especially for installation on the shafts of integral-horsepower electric motors up to 15-hp rating. Used with a flexible coupling, it provides a satisfactory connection between the motor shaft and the driven shaft without the necessity of maintaining exact alignment, the company says.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 825.

Essentials of Drafting

A new book, "Technical Drafting Essentials", has been authored by Warren J. Luzadder and published by Prentice-Hall, Inc., 75 Varick St., New York 13, N. Y. The author's principal object has been to create a nearly self-teaching text that presents the theory and conventions of projection and dimensioning in accordance with present-day practices.

In most cases, the illustrations in the book have been selected and designed to repeat completely the accompanying text, in graphic language. A number of problems are given at the end of each chapter to allow a range of selection; chapters covering specialized divisions of technical drafting have many practical problems. Text material conforms to the latest American Standard Drawings and Drafting Room Practice as adopted and published by the American Standards Association. The text also includes an architectural-drafting section written by William S. Hornung, Director of the New York Technical Institute. The price of this book is \$4.00.

Diesel-Engine Catalog

A new catalog on the Series 71 two-cycle diesel engines has been announced by Detroit Diesel Engine Division, General Motors Corp., 13400 W. Outer Drive, Detroit 28, Mich. It covers single and multiple-engine units from 2 to 24 cylinders, with horsepower ranging from 32 continuous to 780 intermittent.

The 36-page booklet contains complete data on the GM diesel two-cycle design and its interchangeability of parts. A "Select Your Power" Chart covering 57 standard power-takeoff and 7 torque-converter models enables the user to select an engine that meets his individual requirements. The booklet also discusses in some detail the unit injector fuel system, the Uniflow principle, and the parts and service facilities of Detroit Diesel. Illustrations and specifications for all engines in the series are included in the booklet.

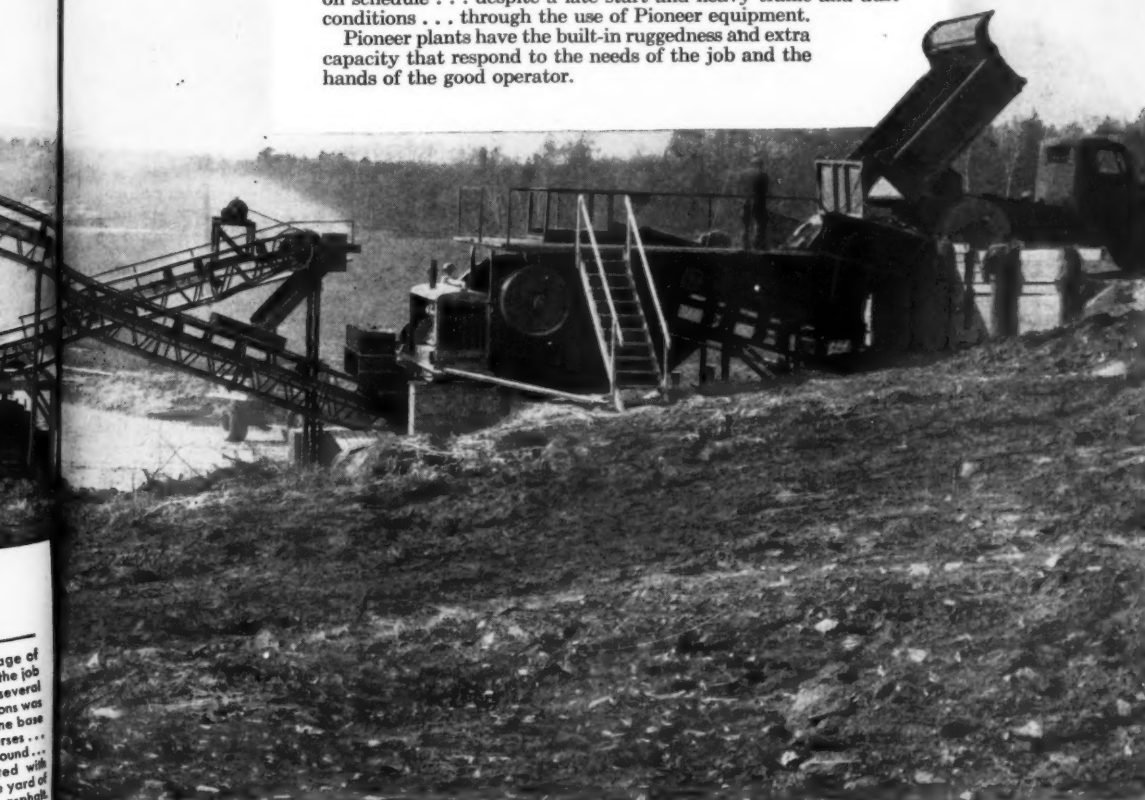
This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 755.

Equipment will help you win

Helps contractor make up for late start on Vassalboro-Winslow Project

LOST TIME often can be regained . . . when you have Pioneer equipment to help you out! H. E. Sargent, Stillwater, Maine, had from June 20 to August 16 to prepare the base for 9.14 miles of roadway. This required 37,000 tons of crushed stone, 42,000 cubic yards of gravel. It meant a crushing job averaging 1300 tons a day . . . producing four sizes of stone. This job was done and done on schedule . . . despite a late start and heavy traffic and dust conditions . . . through the use of Pioneer equipment.

Pioneer plants have the built-in ruggedness and extra capacity that respond to the needs of the job and the hands of the good operator.



HAVE THAT Pioneer Edge WHEN YOU BID

Who gets the job when bidding is close? The operator who can get the most in production per hour, per dollar, per machine, per man. Have that Pioneer Edge on your side! Send coupon for more facts and figures.

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Kentucky Hospitality Reaches to Roadside

Overlooks at Historic or Scenic Spots, and Roadside Table Sites Are Also Part of Kentucky Program

By G. HARRY BOWEN, Engineer of Roadside Improvement, Kentucky Department of Highways

• TO keep stride with the large influx of tourists into Kentucky, the State Department of Highways is endeavoring to provide the means which will make these visitors enjoy their trips, and will encourage their return and their favorable comment to others. A network of roadside parks is now being developed over the state on the main highways, together with numerous roadside table

sites, and overlooks at scenic or historic places.

Roadside Parks

In order to reflect the hospitality of Kentucky, we endeavor to make our roadside parks as adequate as possible. A roadside park consists of an area of 1 to 2 acres, and a fully developed park is provided with a safe place to park, tables, trash cans, grills, toilet facilities, safe drinking water where obtainable, and a storage shed. A standard at-the-site sign and two other advance warn-



Kentucky Dept. of Highways Photo

One of Kentucky's 9 roadside parks is near Hughes in Boone County, on U. S. 42.

ing signs not only serve as trade marks for these areas, but also attract and invite the traveling public to stop and rest.

While we think of a complete road-

side park as having all the facilities mentioned, it is not our intention to develop each park fully at first. Rather, it will be our policy to make only a partial development in order that more such areas can be spread over a wider portion of the state with what funds are available. This initial development usually consists of tables, grills, warning and at-the-site signs, and an adequate parking area. Then, as funds permit, the other facilities are added until the park is complete. The complete or almost-complete areas are maintained by a caretaker. He is usually a local man who can visit the park at least once a day and see that it is clean and properly supplied for public use.

Before the State can develop these roadside parks, it is necessary to obtain control of the land either by title or a long-term lease. Areas for roadside parks are not just any tract of ground. There are definite site requirements. The first factor is that of safety. There must be adequate sight distance on the highway, and the area should not be located on a dangerous curve or a very steep grade. Preferably the area is on a level with the highway to facilitate entrance and exit. However, this is not always possible, so other-than-level sites are sometimes developed. All sites for roadside parks should have considerable shade, while other natural features such as a good view, springs, or a location of historic interest are of course desirable.

The land is seldom bought by the Highway Department, since the cost is usually prohibitive and little money would be left for development. We now have quite a number of sites donated by individuals. When these are developed, we will select areas where parks are needed, and then depend on the cooperation of civic clubs in the area to assist us in the location of the best site for the park and in acquisition of the land. Many clubs are very anxious to sponsor such a park as a civic project. Often the parks serve as memorial areas. We have received excellent cooperation also from the U. S. Corps of

(Concluded on next page)



Saved

HUNDREDS OF DOLLARS PER MONTH IN PULVERIZING!

An example of how the AMSCO Hardfacing System can help you fight wear profitably

Here's why the AMSCO HARDFACING SYSTEM can save you money

Hardfacing recommendations are as sound as the manufacturer who makes them. For a half-century, Amsco has specialized in fighting the high cost of wear—first with manganese steel and later with another big weapon . . . AMSCO Hardfacing Rods and Electrodes.

The result is the AMSCO Hardfacing System . . . where a wide range of Amsco Rods are selected for use according to a systematic appraisal of the equipment part and wear factors involved.

Whether your particular problem is one of wear caused by impact, abrasion, heat, corrosion—alone or in combination . . .

Amsco has both the research facilities and the years of on-the-job experience necessary to help you make important reductions in your operating costs.

A large Pennsylvania brick company was faced with this problem: their pulverizer plows wore out every two weeks due to extreme abrasion of clay with a high silica content. An expensive period of down-time and replacement labor resulted.

In trying to stop this high replacement cost, a test was made. Each plow was hardfaced with AMSCO Tungrod—specially developed by Amsco research for high resistance to abrasive wear.

Result? The plows hardfaced with AMSCO Tungrod lasted 4 times as long . . . 3 out of every four replacement jobs were eliminated! The saving amounted to several hundred dollars each month!

AMSCO Tungrod permits big savings—through longer service and fewer replacements—on many other applications. If you have an equipment part used in cutting or pulverizing non-metallic materials, the possible savings—to you—are too big to be overlooked!

Write today for illustrated hardfacing catalog — and nearest distributor's name.

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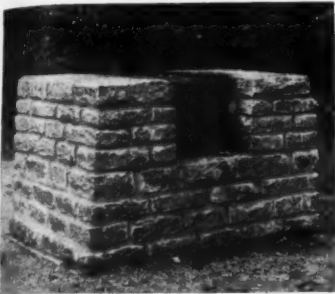
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Kentucky Dept. of Highways Photo

Here is a typical grill in Kentucky's Mason County roadside park.

Engineers and the TVA, both of which have offered several areas for development adjacent to reservoirs and lakes.

At present there are 9 roadside parks in Kentucky, several of which are not fully developed. However, there are a large number awaiting development, and 12 have been approved for the 1950-51 program. It is hoped that in not too many years a large network of parks will cover the state, to serve both Kentuckians and the passing tourist.

Overlooks

Overlooks are constructed at carefully chosen sites to give an unobstructed view of some outstanding scene or historic feature. At present there are 12 such overlooks, but with the creation of new roads and bridges throughout the state, and immense new lakes such as Wolf Creek Reservoir, more overlooks will be planned for the coming year.

Scenery in Kentucky is varied. From our overlooks can be viewed rugged mountain scenery, the gap that was traversed by Daniel Boone, and lakes such as Herrington. Other overlooks give views of the Kentucky River with the Memorial Bridge at Clay's Ferry, and the Salt and the Ohio Rivers; while from one can be seen the junction of the Ohio and the Mississippi Rivers and the bridges over both.

Roadside Table Sites

As a further convenience to the tourist, numerous roadside table sites are located on highway right-of-way along our main traveled roads. They consist of a small parking area for several cars, and one or more picnic tables. Trash cans are also provided, with signs asking that the public help keep these areas clean. There will be standard roadside table signs, both of an advance and at-the-site nature, to mark these areas throughout the state. At present there are about 300 tables placed along our main roads, and these receive heavy use.

It is hoped that the combination of roadside parks, table sites, and overlooks will do much to make a trip through the state an enjoyable one, so that tourists will always have pleasant recollections of Kentucky and develop good will toward the State.

Data on Microfilming Engineering Drawings

A new 14-page booklet, "Facts and Figures on Microfilming Engineering Drawings", can be secured from Micro-Photo Service Bureau, 4614 Prospect Ave., Cleveland 3, Ohio. It covers all services rendered by this organization, the equipment used, cost, and protection offered for your valuable drawings. And it points out that this nationwide organization has Photomobiles which enable microfilming work to be carried on right at your office.

The booklet discusses reproductions of microfilm drawings, additions and revisions to be made on the drawings, indexing for easy reference, safe filing methods, and the type of equipment used in the process. It also describes and illustrates the equipment offered to organizations who have enough

drawings to warrant doing their own work.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 751.

Salvage by Metallizing

The current issue of "Metco News", a bimonthly report prepared by Metallizing Engineering Co., Inc., 38-14 30th St., Long Island City, N. Y., describes and illustrates several good metallizing salvage applications. The stories indicate savings in time, cost, and scarce metals in the repair of equipment.

This issue and succeeding copies may be obtained by writing the company, or by using the Request Card at page 16. Circle No. 713.

Hydraulic Truck Crane Uses Any Truck or Winch

A 6-page broadside describing the Pitman Hydra-Lift, a hydraulic crane designed for mounting behind the cab of any truck, is now available from Pitman Mfg. Co., 300 W. 79th Terrace, Kansas City, Mo. The literature points out that in addition to performing all the normal truck-crane functions within its capacity, this unit enables self-loading of your truck or truck-trailer combination.

Features of the unit include positive hydraulic action, full 180-degree swing, full 100-degree lift, a telescopic boom, and adjustable outriggers. Each feature is illustrated with action photographs. Complete specifications of this unit,

which has a 6,000-pound lift capacity with the boom at 11 feet, are included. A large side-view photograph of the Hydra-Lift illustrates its salient construction and operational features. The first in importance of these, the catalog says, is that the unit takes up only 35 inches behind the cab, allowing normal use of the truck bed.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 757.

Speco Office in East

Speco, Inc., manufacturer of anti-rust paints, wood preservatives, etc., has opened an eastern district sales office at 30 Church St., New York, N. Y. David M. Waterhouse is District Manager.



"Washington calling!"

We were expecting this call. In a sense it is the people of America on the other end of the telephone. For some time they have been calling upon our government to take whatever steps are necessary to equip our fighting men for any job they may have to do.

Korea has proved the fallacy of limited preparedness. You know now that the nation is girding for survival. The people of America have said—and rightly—that private industry should provide the Armed Forces with whatever is necessary.

Machines are being mobilized. "Caterpillar" products are wearing olive drab once more. Because of large military demands your present machines may have to work longer than you had anticipated.

You can get many extra hours of machine service life if you:

- 1 Follow a sound program of operation and maintenance.
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Diesel Engines • Tractors • Motor Graders • Earthmoving Equipment



Flexo-Screens enable you to apply your own name design in any color of enamel to any piece of equipment. Here the screen is being tilted gently in removal.

New Screen Method "Letters" Equipment

The new Flexo-Screens, developed by Equipment Identification Co., 514 Peoples Bank Bldg., Indianapolis 4, Ind., enable you to apply your own name design to any piece of equipment in the field or in the shop. With this method you can print your identification with a raised enamel lettering in any color. The company points out that no skill or experience is necessary. The screen plates are made in any size and design, suitable for trucks, shovels, rollers, etc., and fit door curves or flat surfaces. According to the manufacturer, Flexo-Screens will give hundreds of impressions.

The name design is applied as follows: First, place a little enamel on the screen plate at the margin. Second, hold the screen plate firmly against the surface while drawing the enamel across the letters. Third, gently tilt the screen to remove. A clearly outlined impression and lettering will remain in raised enamel. The screens may be easily cleaned with kerosene, using a paint brush or rag.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 785.

Custom-Built Equipment

The new 18-page Bulletin PC-50 issued by Pacific Coast Engineering Co., Oak and Clement Sts., Alameda, Calif., features custom-built plant equipment,

mobilize for production-line output.

The booklet illustrates the company's facilities for fabrication, engineering design, machine work, specialized services, and assembly and erection of heavy steel components. It also illustrates a wide variety of the specialized products manufactured by the company.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 729.

Half-Yard Trench Hoe With Gooseneck Boom

Announcement is made by Harnischfeger Corp., Small Excavator Division, Milwaukee 14, Wis., that its 1/2-yard-capacity trench hoe, the Model 150, is now equipped with a gooseneck boom. This new boom follows the design which was introduced recently on the P&H Model 255-A.

The boom is designed to give 50 per cent greater speed through the use of



A gooseneck boom is now standard on the P&H Model 150 trench hoe to increase digging reach and speed and dumping height.

a 2-part hoist line, and to increase digging reach and dumping height. The trench hoe can start a trench with a vertical cut and can trim vertical walls. A special hoe-stick linkage provides a chopping action. The Model 150 is also adaptable for use as shovel, dragline, clamshell, or crane.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 777.

**Don't let water
delay construction . . .**

**PUMP IT OUT--
WITH A**

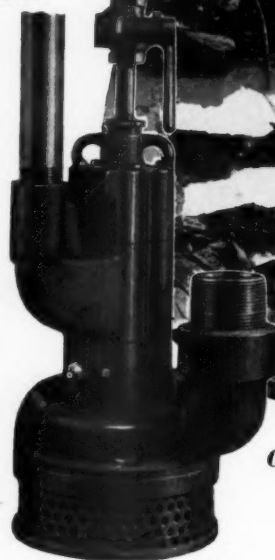
**CLECO
183-A AIR OPERATED
SUMP PUMP**

**340 GPM AGAINST
A 10-FOOT HEAD**

**124 GPM AGAINST
A 70-FOOT HEAD**

High capacity, light weight, low air consumption and positive operation make the Cleco 183-A Sump Pump the first choice wherever a high-capacity portable pump is needed.

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The one-man Vibro-Plus Roll-gear Internal Vibrator will help you roll back rising labor costs and do a better job.

Available in electric, gas-engine or pneumatic-driven models delivering from 11,000 to 15,000 V.P.M. Exclusive patented features assure years of trouble-free operation.

Write for complete details and name of nearest distributor.



54-11 Queens Blvd., Woodside, L. I.

Low-Cost Way to Get High-Strength Bases

Lime and Fly Ash Mixed With Soil or Aggregate Gives Strong Road Base Resistant to Wet, Dry, Freeze, and Thaw

• MIXING lime and fly ash with sandy soil, slag, or crushed stone results in a road base of high strength, resistant to wetting and drying and to freezing and thawing. Tests establishing this useful fact were financed by the Philadelphia Electric Co. and were reported at the Highway Research Board meeting last January by L. John Minnick, Chief Chemist of G. & W. H. Corson, Inc., Plymouth Meeting, Pa., and Richard H. Miller, Instructor in the Civil Engineering Department of the University of Pennsylvania, Philadelphia.

Since such compositions are available in enormous quantities at low cost in this country, the tests are doubly significant. Messrs. Minnick and Miller also report that several test roadways have been built to supplement the laboratory studies, and that they are showing excellent performance after more than a year in place. Still further studies are under way of soil types other than those used in these tests, and will be reported later.

Previous Experimental Work

Fly ash has for some time been recognized as a pozzolan in compositions which contain lime or another alkali. For example, when it is used in concrete, the calcium hydroxide produced by the hydrolysis of portland cement combines with the fly ash to form cementitious silicates which greatly increase the strength of the concrete. Several years ago, Havelin and Kahn of the Philadelphia Electric Co. turned up a very surprising laboratory product when they added small amounts of hydrated lime to fly ash in the presence of water and aggregates such as sand. When aged for 28 days or longer, the product showed high compressive strength. However, the proper amounts of lime to be added narrowed down into a very critical range. When amounts above or below that range were used, the result was a composition of much lower compressive strength.

The study reported by Minnick and Miller applied Havelin and Kahn's findings to base-course construction. Here is how it was conducted:

Materials Used

The soil used was selected from Ocean County, New Jersey, and was typical of material found abundantly in the southern section of the state. Its Highway Research Board classification is Type A-3.

The investigators also used a boiler slag, which they obtained from a stockpile at the Burlington Station of the Public Service Electric & Gas Co. of New Jersey. The stockpile had been accumulating for several years and already contained substantial amounts of fly ash—between 20 and 28 per cent by weight. No attempt was made to separate the fly ash from this mixture.

Some of the tests employed crushed limestone and crushed gypsum rock as aggregates. These tests were run primarily to determine whether other aggregates lacking in silica conform to the general pattern established with sandy soil and slag. The limestone came from a large stockpile of B screenings at a commercial limestone plant. The gypsum rock also came from a large commercial producer.

The following tables show the screen analyses and properties of the soil and

aggregates:

Properties of New Jersey Soil		
Sieve Number	Total Per Cent Retained	
4	0.43	
8	4.10	
16	10.50	
30	21.45	
50	60.08	
100	87.42	
200	94.36	

Liquid limit	0
Plastic index	NP
HRB soil classification	A-3
Dry rodded density (lb./cu. ft.)	100
Maximum dry density (lb./cu. ft.)	119
Modified AASHO	
Optimum moisture content (per cent)	5.9
Modified AASHO	

(Continued on next page)



Also 4-hp and 7-hp Chain Saws in sizes from 19" to 72".
LOMBARD GOVERNOR CORP., Ashland, Mass. Dealer Opportunity.

GAR-BRO Power-carts MOVE MORE CONCRETE at less cost!



ONE MAN AND A POWER-CART can do as much work per day as 6 to 10 men with wheelbarrows or 3 to 4 men with push carts because the Power-Cart handles more (up to 14 cu. yds.) and travels faster (up to 12 mi. per hr.).

On the Power-cart the driver rides—uphill, downhill, on 5 ft. runways or over rough ground. He can start fast and stop fast. Has complete control to dump the load or place it carefully.

Get the complete facts; write for Bulletin No. 83.

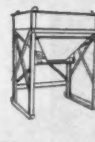
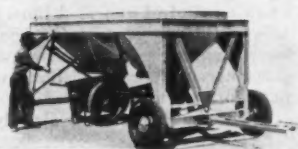
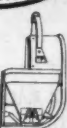


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Buckets

World's most complete line—25 models ranging from 1/2 to 8 cu. yd.

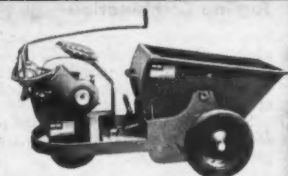


Hoppers

Includes portable, tower and floor hoppers (28 models) with cap. to 10 cu. yds.

Chutes

A complete line of concrete collection hoppers, steel drop chutes, rubber elephant trunk & line chutes.



Carts

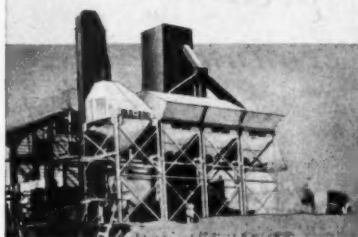
Power-carts with concrete tray, box tray or platform (cap. up to 14 cu. ft.—2000 lbs.). Also six models of hand-push concrete carts.

Barrows

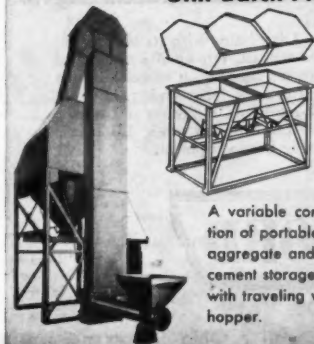
complete line (35 models) with steel or aluminum trays and with wood or steel handles.



Bin Gates and Weigh Hoppers in all styles and types.



Unit Batch Plants



A variable combination of portable aggregate and cement storage bins with traveling weigh hopper.



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2416 East 16th St., Los Angeles 21 / Dealers everywhere

Low-Cost Way to Get High-Strength Bases

(Continued from preceding page)

Properties of Aggregates				
Sieve Number	Total Per Cent Retained			
	Fly Ash-Boiler Slag	Crushed Limestone	Crushed Gypsum Rock	
4	2.4	10.1	0.9	
8	10.3	32.4	14.6	
16	37.9	47.2	38.0	
30	66.0	51.5	54.5	
50	73.8	58.0	65.9	
100	78.2	89.8	77.1	
Fineness modulus	2.68	2.89	2.51	
Specific gravity	2.88	2.63	2.34	
Dry rodded density (lb./cu. ft.)	130	93	98.6	

The tests employed a standard dolomitic hydrated lime such as is commonly used for structural purposes. The fly ash used was typical of material available in the Philadelphia area, and corresponded essentially to the fly ash already present in the boiler-slag mixture. The following tables indicate the properties of the hydrated lime and fly ash:

Properties of Hydrated Lime and Fly Ash		
Chemical Analysis	Hydrated Lime	Fly Ash
SiO ₂	1.0	40.32
Fe ₂ O ₃	0.4	13.39
FeO	—	3.95
Al ₂ O ₃	0.2	32.92
CaO	47.8	2.34
MgO	33.8	0.74
Loss on ignition	16.3	5.79
CO ₂	0.8	—
H ₂ O	0.5	—

Sieve Analysis:		
Sieve number	Total Per Cent Retained	
60	1.0	2.0
100	2.8	10.1
200	5.6	21.0
Specific gravity	2.60	2.20
Dry rodded density (lb./cu. ft.)	45	60

Test Procedure

Three tests were conducted on the mixtures: wetting and drying, freezing and thawing, and unconfined compression.

Standard AASHTO procedure was followed in the wet-dry and freeze-thaw tests, except that longer aging periods were employed during the curing of test specimens. The lime-fly ash reaction proceeds slowly and continues for months and years; hence, though appreciable compressive strength developed in 7 days, the investigators felt it was desirable to give the specimens at least 28 days of aging before proceeding with the tests.

They ran the unconfined-compression tests on specimens molded in 4-inch-diameter Proctor molds. These specimens were cured in a moist closet for 28 days. In addition, after some specimens had undergone 12 cycles of wetting and drying, they too were broken in compression.

Dry materials were weighed out in previously established increments. Mixtures were proportioned by weight, using the density values already cited in the tables. After the dry materials had been mixed completely, water was added, and the mixing continued by hand. The procedure was similar to that used in preparing mortar specimens for compressive-strength tests.

Proportions for the New Jersey soil and for the crushed-stone products were established by the Proctor procedure. The optimum fly-ash content was established by determining the maximum density of a number of fly ash-aggregate mixtures containing a small amount of hydrated lime. Using this optimum percentage, specimens were then made up containing variable percentages of hydrated lime—up to 6 per cent by weight.

Since the boiler slag already con-

tained fly ash in about optimum amounts, no attempt was made to vary the fly ash-boiler slag proportions in this series. Tests on this material involved only the addition of lime.

Test Results

Without going into too much detail on the results (which will be contained in the HRB proceedings when they are published) it is possible to generalize as follows: concerning the New Jersey soil in wet-dry and freeze-thaw tests: The optimum fly-ash content was shown to be 16 per cent by weight. Samples to which 1, 3, and 6 per cent of lime were added showed relatively little moisture change and weight loss during the tests.

The same results are reported for the boiler slag. No adjustment of the fly-ash content was made, you will remember, so only the lime content was varied—from 0 to 5 per cent by weight.

It should be emphasized that freeze-

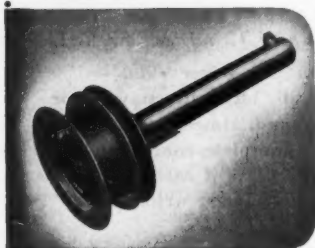
thaw resistance was greater in all specimens cured for longer periods of time.

As for compressive strengths, here are some sample results: New Jersey soil mixed with 16 per cent, by weight, of fly ash and 3 per cent of lime developed a compressive strength of 450 psi at 28 days. Boiler slag which already contained 25 per cent, plus or minus, of fly ash, and to which 5 per cent of lime was added, developed a strength of 465 psi at 28 days and 490 psi at 56 days. Gypsum rock containing 20 per cent of fly ash and 2 per cent of lime developed 390 psi at 7 days. Crushed limestone containing 25 per cent of fly ash and 3 per cent of lime developed 292 psi at 7 days and 604 psi at 28 days.

Several compression tests were also made on specimens containing 1 per cent by weight of calcium chloride. The investigators found that 7-day

(Concluded on next page)

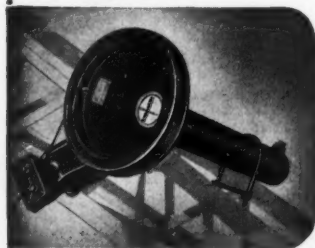
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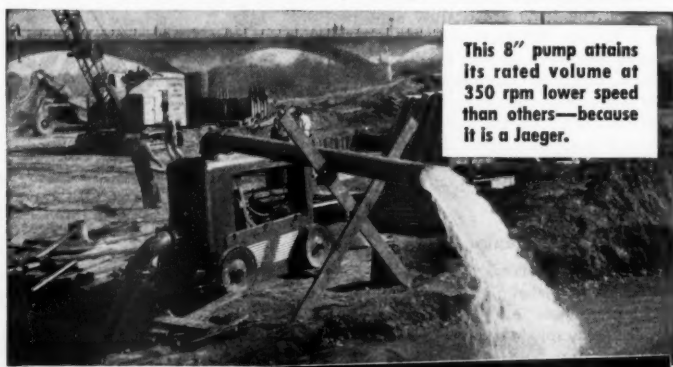
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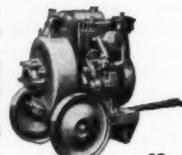
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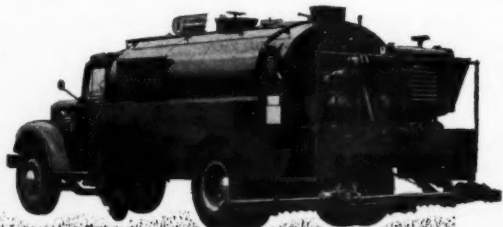


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strengths were about three to four times those obtained with mixtures that did not contain calcium chloride. Thus, since the calcium chloride increases early strength, it should be considered for field use whenever freezing weather is expected.

As for the boiler-slag specimens which were broken in compression after 12 cycles of wetting and drying, the results were as follows: 1 per cent by weight of hydrated lime produced a compressive strength of 385 psi; 2 per cent, 1,100 psi; and 3 per cent, 1,850 psi. These tests were made on specimens 38 days old, including the curing storage and the wetting-and-drying cycles.

Suspension-Bridge Vibration

After the collapse of the Tacoma Narrows Bridge in 1940, the Bureau of Public Roads set up an Advisory Board on the Investigation of Suspension Bridges. This board has since sponsored a series of studies to determine the causes of suspension-bridge vibration and to work out design methods to reduce it. Now the BPR has published a 450-page report of the study, called "The Mathematical Theory of Vibration in Suspension Bridges."

The book covers the history of troublesome dynamic stress effects in suspension bridges and states the dynamic problem and the physical data needed for its solution. It studies frequencies, modes of vibration, and energy storage in freely vibrating suspension bridges with continuous stiffening frames, and the influence upon them of various design factors. It takes up structural damping, the flutter theory of truss-stiffened suspension bridges under wind action, and the linearized-deflection theory developed for suspension bridges having tower stays.

Authors of the study are Dr. Friedrich Bleich, Consulting Engineer, American Institute of Steel Construction; Dr. C. B. McCullough, Assistant Chief Engineer, Oregon State Highway Commission; Richard Rosecrans, Structural Research Engineer, Oregon State Highway Commission; and George S. Vincent, Principal Highway Bridge Engineer, BPR. Drs. Bleich and McCullough died before their work was published.

Copies of the study may be obtained from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C., at \$1.25 each.

Catalog of Portable Tools

A 74-page catalog on a complete line of portable tools for the construction and automotive-service industries has been prepared by Skilsaw, Inc., 5033 Elston Ave., Chicago 30, Ill. Saws, drills, screw drivers, nut runners, belt and disk sanders, bench grinders, portable grinders, electric hammers, valve refacers, valve-seat grinders, and many accessories are presented in the catalog.

These tools are made in a number of models with a wide range of capacities. The catalog provides illustrations, and lists features and detailed

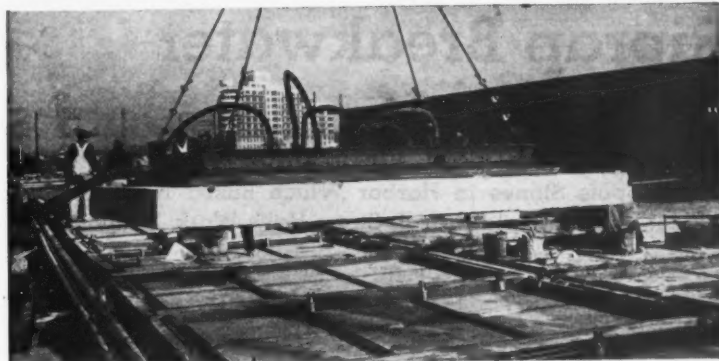
specifications for each tool. Action-type photographs show some of the uses to which the tools may be put in the construction industry.

This literature may be obtained from the company by requesting Catalog No. 50, or by using the Request Card at page 16. Circle No. 702.

Safety Connecting Links

A pocket-sized circular describing Wedglok safety connecting links is available from Interstate Drop Forge Co., 4043 N. 27th St., Milwaukee 16, Wis. It points up the features of these links and their simplicity of assembly, giving dimensioned sketches and complete specifications for each available type. The company reports that the links exceed in strength the published strength of comparable alloy chain, and that they may be assembled rapidly without special equipment.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 781.



The Vacuum Concrete Lifter removes slabs when only twelve hours old.

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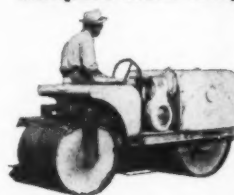
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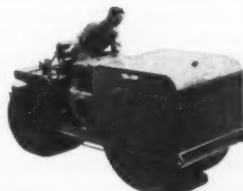
MODEL 200, 1½ to 2 tons. 60-110 lbs. compaction per lineal inch.



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Riprap Breakwater Guards Harbor Docks

Crane Spots Stones in Harbor Which Based North Atlantic Fleet During World War II; Storm Halts Work Temporarily

• THE great natural harbor of Portland, Maine, has piers closer to the open ocean than any other port on the Atlantic coast. It is also nearer Europe than any other deepwater American port, and was the base of the North Atlantic Fleet during World War II. Last construction season the Corps of Engineers, U. S. Army, New England Division, made a noteworthy improvement in the harbor by building a riprap breakwater to protect the docks that lie close to where Fore River flows into the harbor.

Work on the breakwater got under way early in June, 1950, after the Boston headquarters of the Division Engineers awarded a contract for the construction to Bradford Weston, Inc., of Hingham, Mass., on its low bid of \$192,500. The contractor was given a year in which to complete the structure, which is estimated to contain 42,000 tons of stone riprap. The breakwater is not yet finished. A November storm washed off the gravel and crushed-stone truck road, and work was discontinued. A winter clause in the contract enables the contractor to suspend work and start up again this May to finish the remaining 2,000 tons or so of the original contract.

The new breakwater is about 900 feet long, extending in a northeasterly direction from the ramparts of historic old Fort Preble on the South Portland shore, to the Spring Point Lighthouse. This offshore lighthouse heretofore was reached only by boat, but now the keeper and his assistants will be able to walk to the mainland over the breakwater. It is 15 feet wide on the crest or top, with a 2 to 1 slope on the side facing out to the open sea, and a steeper 1½ to 1 slope on the sheltered harbor side. The depth of the water along the breakwater ranges from 4 feet near shore to 14 feet at the lighthouse (MLW). Top elevation of the breakwater is 15.0, the sea wall around the fort is at 18.74, and the platform of the lighthouse is 25.8.

Big Sharp Stones

Across the bottom of the breakwater, the width varies with the depth of the water, measuring from 43 to 112 feet. The greatest part of this width is from the center line of structure to the toe of slope on the sea side, thus giving the breakwater the maximum stability where it is most needed.

According to the specifications, 75 per cent of the stone used weighed over 5 tons for each piece, with the average stone being around 8 tons. Of the remaining 25 per cent, the weight range per piece was from ½ to 5 tons, with the average around 3 tons. Not over 10 per cent of the stone could be rectangular in shape, the emphasis being placed on big sharp stones that interlocked well with each other, and would not be moved from position easily in a heavy storm.

The requirement for nonrectangular-shaped stone removed from consideration the goodly number of stones on and about the job site that once formed the walls of the old fortifications. They were all cut blocks with their edges and corners well rounded from time and the elements. Most of the stone the contractor obtained from Swenson's Quarry at Wells, or the Biddeford Quarry at Biddeford, Maine, involving hauls of 30 and 16 miles respectively. The chief product of these quarries was

monument stone, but the irregular-shaped by-products, or rock chunks that were not usable for such a purpose, made good pieces of riprap.

Hauling and Placing

Hauling from quarry to job site was handled by the Chase Transfer Corp. of Portland under a subcontract, using a fleet of eight trucks hooked up with semitrailers. Each carrier took about 15 tons of rock per load, but with the larger-size stones this often meant only two or three pieces to a truck. The

principal contractor loaded the stone with a Lima 2-yard shovel and a Lorain 1¾-yard crane. The hard granite weighed 165 pounds to the cubic foot, and an average of 350 tons of material was moved each day during the quarrying operations.

At the breakwater the stone was unloaded by a Lima 1½-yard crane equipped with a 60-foot boom and an Owen 1-yard special stone bucket. The bucket was reinforced with four teeth, two on each side, which permitted the picking up of a single stone weighing as much as 12 tons. The crane placed the stones directly on the breakwater, putting the largest ones at the toe of slope as much as possible.

As the breakwater gradually built up from the rocky harbor bottom above the level of the water, the contractor filled the interstices roughly with stone chips, and laid gravel on top to provide a rough haul road. In this way the crane remained out on the breakwater, while the trucks backed out to the rig with their loads of

stone. This work roadway was provided by the contractor at his own expense, since the lighter stone chips and gravel top were continually being washed away by the wave action of the sea.

Improves Harbor

The provisions of the contract required that at least 3,000 tons of riprap be placed in the breakwater each month. This specification was readily complied with, since the contractor more than doubled this figure for each 30-day period when the weather did not interfere with the work. He worked a 10-hour day, only occasionally being forced to remove his crane from the breakwater because of the wind and high waves.

A small crew took care of the stone placing, with Harry Fish, veteran crane man, operating the Lima rig, with two helpers—an oiler and a weigh man. The latter weighed each stone at the South Portland shipyard, a short distance from the site of the work, before the

(Concluded on next page)

These Concrete Project Case Histories Prove

the Advantages of PLYWOOD FORMS



1. Smooth, Fin-Free Concrete

Almost three million square feet of plywood forms were used to form mirror-smooth concrete surfaces on the huge Parklabea Housing Project, Los Angeles. So smooth were ceiling slabs that the concrete was merely painted and left exposed. Architects report: "We consider the results amazing." Architects on the project: Leonard Shultz and Associates, New York, represented in Los Angeles by Gordon Kaufman & J. E. Stanton. General contractors: Starret Bros. & Eken, New York.

1. Smooth, Fin-Free Concrete
2. Multiple Re-Use
3. Time and Labor Savings
4. Design Adaptability

GIANT APARTMENT DEVELOPMENT, industrial building or heavy construction project—Douglas fir plywood is ideal for every type of concrete form work. Versatile and adaptable, plywood forms create smooth, clean, monolithic surfaces... speed work... contribute to overall job economy through simplified form construction, labor savings and panel re-use. Highly moisture-resistant glues used in PlyForm®—the special concrete form grade of Interior-type plywood—permit multiple panel re-use (as many as 10 to 15 are not unusual). For greatest possible re-use, however, specify EXT-DFPA • CONCRETE FORM® bonded with completely waterproof adhesives which permit panel re-use until the wood itself is literally worn away. For the finest possible concrete surfaces, panels having "A" face veneer, or one of the new plastic faced panels may be used.

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C. & E. M. Photo

The partially completed breakwater in Portland Harbor, looking from the rampart of old Fort Preble out to Spring Point Lighthouse.

riprap was placed.

The new riprap breakwater not only protects the docks at the lower end of

Fore River, along which are located the big shipyards, but is also expected to increase the current in the river chan-

nel. With a stronger flow in the river there is less tendency for silt to deposit on the bottom, thus reducing the

amount of maintenance dredging necessary for full channel depth. Portland harbor was but recently improved under a dredging contract. (See C. & E. M., October, 1950, pg. 59.)

Personnel

Bradford Weston, Inc., of Hingham, Mass., was represented on the breakwater contract by Bradford Weston, Jr., as Superintendent.

Col. H. J. Woodbury, Division Engineer, New England Division, Corps of Engineers, U. S. Army, is supervising construction of the project. He is represented at the site by Aarne Koskela, Resident Engineer. H. A. Whitcomb is Chief of Operations for the New England Division.

Fight-Waste Program Launched by Saw Co.

A fight-waste program designed to keep every chain saw in the field working at top efficiency has been announced by Henry Disston & Sons, Inc., Philadelphia 35, Pa. To implement this program Disston will use dealer co-operation, owner education, traveling classrooms, and an advertising campaign.

Disston will school hundreds of its service stations in faster repair and maintenance techniques. It will also augment its operating manual with a series of simple check charts that tell at a glance the symptoms of mechanical failure in a saw, the probable cause, and corrective measures. Cross-country mobile units will switch from field demonstrations to service training. Factory-trained mechanics will show proper maintenance methods to owners in scores of American cities. Through this program Disston intends to "tell every chain-saw owner everything we know about the proper use and maintenance of chain saws, and every device we know that checks inefficiency and increases production."

Catalog on Open Steel Mesh

A new bulletin outlining the properties of open steel mesh is available from William F. Klemp Co., 6644 S. Melvina Ave., Chicago 38, Ill. Products covered in the catalog include structural-steel footwalks, power-forged and riveted open steel gratings and threads, Hexsteel heavy-duty surface armor, Ganister lining reinforcement meshes, Floorsteel flexible floor armor, open steel and aluminum bridge decking, and Flexsteel flexible open steel conveyor belts. Each product is illustrated by photographs and dimensioned drawings. There are also brief descriptions and specifications.

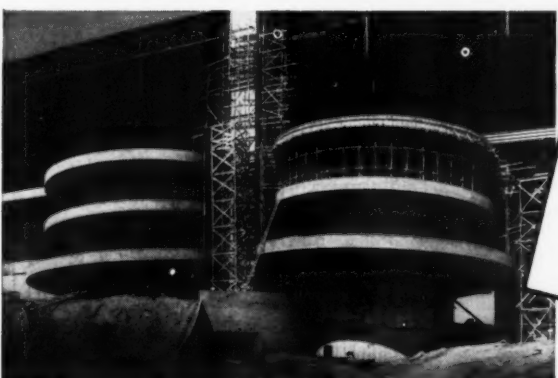
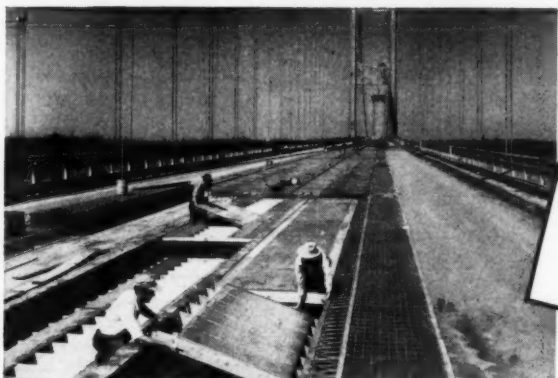
This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 773.

Allis-Chalmers Men Climb

W. A. Roberts has succeeded the late Walter Geist as President of Allis-Chalmers Mfg. Co. He began his career with the company in 1924 as a salesman for the Wichita, Kans., branch. Since 1948 he has been a director of the company and a member of the board's executive committee.

W. C. Johnson, formerly Executive Vice President in charge of the General Machinery Division, has been named Executive Vice President for the entire company. R. S. Stevenson has been upped from General Sales Manager of the Tractor Division to Vice President in charge of the Tractor Division.

The company's four new vice presidents are J. L. Singleton, in charge of the General Machinery Division; A. W. Van Hercke and John Ernst, in charge of engineering and manufacturing, respectively, for the Tractor Division; and Fred Mackey in charge of general-machinery manufacturing.



2. Multiple Re-Use

"We've found plywood forms to be the most economical for several reasons," says C. J. Rollo, job superintendent for Brown & Root, Inc., contractors for the new Rice Institute Stadium, Houston. "Given proper care, they can be re-used again and again; they're easier to handle, produce better looking concrete." On the job, built-up PlyForm seat forms were still in good condition after up to ten re-uses. An even greater number of re-uses was recorded for PlyForm wall and fence forms. Architects: Floyd & Morgan and Milton McGinty.

3. Time and Labor Savings

"Plywood speeded form work all along the line," says Earl Starbard, job superintendent of Woodworth & Co., contractors for all concrete work on the new mile-long Tacoma Narrows Bridge. On the job, contractors report, use of built-up plywood form sections "cut time and labor costs by 15%." Plywood forms were used to form concrete on the anchors, toll houses, bents and viaduct. Built by Washington State Bridge Authority; Charles E. Andrew, chairman and principal engineer.

4. Design Adaptability

Plywood forms were called on to solve an unusually intricate concrete job in building the spectacular twin-spiral ramps at the University of Washington grid bowl addition. "Plywood forms offered the simplest and least expensive solution," reports Elmer Strand, partner of Strand and Son, General Contractors, Seattle, Wash. "The panels can be re-used many times. They're easy to fabricate into cost-cutting built-up form sections and are easily bent to form curved surfaces." Architects: George W. Stoddard and Associates, Seattle.

Large, Light, Strong Real Wood Panels

For additional data on Douglas fir plywood for concrete form work, write Douglas Fir Plywood Association, Tacoma 2, Wash. Use coupon at right to obtain your free copies of two plywood form booklets: "Concrete Forms of Douglas Fir Plywood" and "Handling PlyForm." Also available is the new Keely PlyForm Calculator. This handy slide rule gives construction data for plywood forms based on hourly rate of pour. Price (including leaflet, "Design Assumptions For New Keely Calculator"): \$1.00.



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Please send free copies of two plywood concrete form booklets described at left.

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☐ Please send Keely Calculators. I enclose \$1.00 each to cover costs.

Cold Asphalt Mix For Patching Work

A cold asphalt mix for resurfacing or patching, that can be laid in either wet or dry weather and can be stockpiled for future use, has been developed by The Carter-Waters Corp., 2440 Pennway, Kansas City 8, Mo. Saturock is available in two sizes of aggregates to meet individual requirements in paving. Type F is designed for a 1¼-inch-compacted surface course and Type L for a maximum 1¼-inch surface course.

Both types are available in truck or carload lots. The company reports that one ton of Saturock will cover approximately 20 square yards of surface 1 inch thick after compaction; it may be compacted by hand or a roller.

Further information on Saturock may be secured from the company. Or use the Request Card at page 16. Circle No. 817.

Wood-Moisture Gage

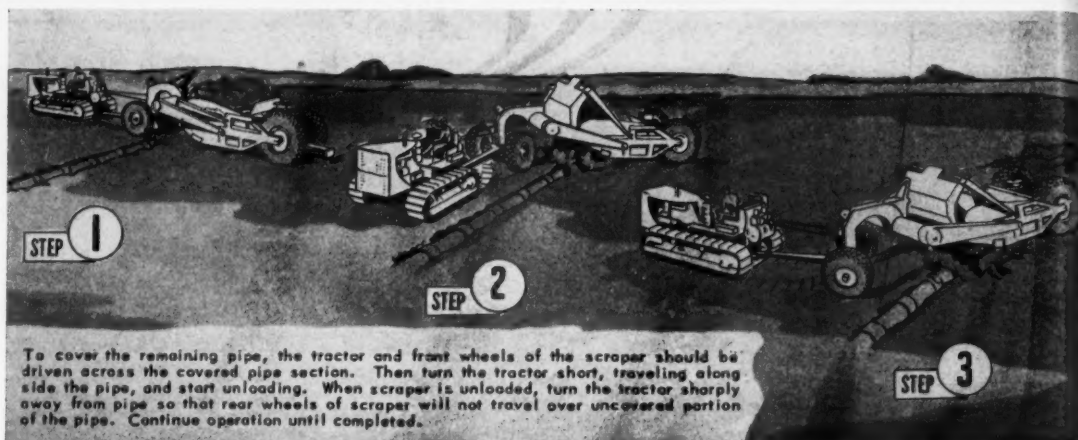
A gage which indicates the moisture content of timber by direct comparison with built-in moisture standards has been developed by Hart Moisture Gauges, Inc., 126 Liberty St., New York 6, N. Y. This comparative-conductivity method is said to eliminate errors from known or unknown changes in the electric variables of the meter. The Kaydel gage provides uniform contact on the wood regardless of hand pressure or curvature of the surface, according to the manufacturer.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 714.

New Simplified Handbook For Equipment Operators

A new type of 4-color handbook in cartoon style has been prepared especially for heavy-equipment operators by Caterpillar Tractor Co., Peoria 8, Ill. The cartoons show operators how to get the best performance and job application possible. Captions explain techniques in the language of a typical job foreman.

The 32-page book contains information on the operation of bulldozers, scrapers, rippers, and cable controls, plus additional material on high-speed hauling and loading, tires, and grade stakes. Designed to make the operation of Caterpillar equipment easy to un-



To cover the remaining pipe, the tractor and front wheels of the scraper should be driven across the covered pipe section. Then turn the tractor short, traveling along side the pipe, and start unloading. When scraper is unloaded, turn the tractor sharply away from pipe so that rear wheels of scraper will not travel over uncovered portion of the pipe. Continue operation until completed.

Here's a typical cartoon from Caterpillar's new comic-book manual, showing steps in backfilling pipe.

derstand, the book shows many earth-moving techniques as compiled by operators and engineers in the field. It explains when to use bulldozers

and how to pioneer sidehill cuts. It covers push-loading, rock and tree removal, soft-fill work, and some do's and don't's of tractor-dozor adjustment

and operation.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 763.

What's U. S. Rubber doing with crushed rock, limestone and gravel?



TODAY "U. S." belts perform an immense number of different tasks in different fields, making great savings in maintenance and in haulage time. "U. S." develops fabrics and compounds—to make belts that meet today's more rigorous demands on belting performance. "U. S." belts have a reputation for lasting years beyond expectations of operators.

THIS U. S. RUBBER BELT carries crushed limestone in a modern, highly efficient plant in the Midwest. The belt has 220-ft. centers and a 17-degree incline. The high output and high mechanization of this plant would be impossible without such specially designed products as this "U. S." Belt.

GRAVEL PLANT that handles up to 150,000 tons of wet sand per year. The "U. S." belt on the outdoor installation above has been working steadily on this job for over 8 years and is still going strong.

HERE A "U. S." CONVEYOR BELT carries crushed rock from pit to surge pile. It has been in operation 8 to 10 hours a day for several years. Its present excellent condition indicates at least 10 years' service life.

PRODUCTS OF
U.S. RUBBER
SERVING THROUGH SCIENCE

UNITED STATES RUBBER COMPANY
MECHANICAL GOODS DIVISION • ROCKEFELLER CENTER, NEW YORK 20, N. Y.

**525 uses and....
Still going strong**

"... We have used these forms (ATLAS SPEED FORMS) about 525 times ... still in good condition. So much so that our intentions are to use them approximately 400 times more with only minor replacements."

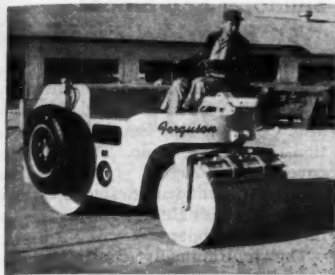
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Building Contractor
Tulsa, Oklahoma

Cost to Howard C. Grubb:
1/4¢ per sq. ft. per use!

IRVINGTON FORM & TANK CORP.
Irvington 33, N. Y.

Send more information. I am interested in forms for:

Name _____
Firm _____
Address _____



The Ferguson 3 to 5-ton maintenance roller can travel on its rubber-tired wheels at normal truck speeds.

New Portable Roller

A new Ferguson 3 to 5-ton maintenance roller that can be easily transported on its rubber-tired wheels is now manufactured by Shovel Supply Co., P. O. Box 1369, Dallas 1, Texas. Without ballast, the Ferguson roller weighs 3 tons and will trail at normal truck speeds. The rubber-tired wheels are raised and lowered by a power-driven hydraulic pump. The towing end of the roller can also be raised instantly by a power-driven hydraulic cylinder for truck attachment.

The new Ferguson roller will operate alongside any standard curb without removal of the transport wheels, since these can be raised 12 inches above the bottom of the roller. However, these wheels can be removed in two minutes by one man, the company says. This permits the roller to operate within 4 inches of a fence or wall.

With water ballast, the Ferguson becomes a 5-ton roller. Water is controlled by valves within easy reach of the operator. The roller is also equipped with 75-gallon sprinkling-water tanks and mats over both rolls. Spring-actuated scrapers are placed at front and back of both rolls.

Powered by a 20-hp 4-cylinder air-cooled engine, the roller has two speeds in each direction, controlled by a single lever. Because of the large diameter of the rear compression roll, there is no tendency to "push" material, the company says. The width of the rear roll is 42 inches. The front steering roll is 30 inches in diameter and 40 inches wide. Both rolls are of heavy steel plate machined to a uniform smoothness with the corners rounded. The frame is also of heavy steel plate.

Further information may be secured from the company. Or use the Request Card at Page 16. Circle No. 779.

Scaffolding Equipment

Two new bulletins on steel scaffolding and scaffolding equipment are available from Wilson-Albrecht Co., Inc., 3569 Wooddale Ave., Minneapolis 16, Minn. The first, Form No. PS-24, describes sectional scaffolding and masons' jacks. It stresses the time and cost-saving advantages of steel scaffold units.

The second bulletin, Form No. PS-26, is designed to help builders select the best means of scaffolding any building operation. It includes photos and descriptions of masons' jacks, chimney scaffolds, sectional scaffolding, carpenters' brackets, interior scaffold jacks, and other equipment. It features the Speedlock method of assembly.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 784.

Aeroquip Buys Metalco

Aeroquip Corp. of Jackson, Mich., has purchased all the outstanding stock of Metalco, Inc., also of Jackson, and will operate the company as a wholly owned subsidiary with Don Mortlock as Vice President and General Manager. Kenneth Meyerholtz has been elected President of Metalco. Fred Corwin is Secretary-Treasurer. A larger plant will

be leased in Sheboygan, Mich., to triple the floor space of Metalco. The company was formerly a substantial subcontractor of Aeroquip, furnishing special hose fittings, tube bends, and elbows used in Aeroquip hose assemblies.

Shock-Absorber Belts

Literature describing Safe-Hi shock-absorber belts is available from Rose Mfg. Co., 1731 Arapahoe St., Denver 2, Colo. The shock absorbers are made of neoprene impregnated, undrawn nylon, and are designed to stop a falling workman gradually instead of with a sudden jolt. This prevents internal or back injury to the man, and breakage of belt, life line, or anchorage.

Several types of belts are available for construction workers. Shock absorbers for attachment to any construction workers' belt are also described in the circular.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 749.

A Self Loading Self Propelled Portable Conveyor

for
CONTRACTORS
QUARRIES
MATERIAL YARDS
CEMENT BATCHING
PLANTS



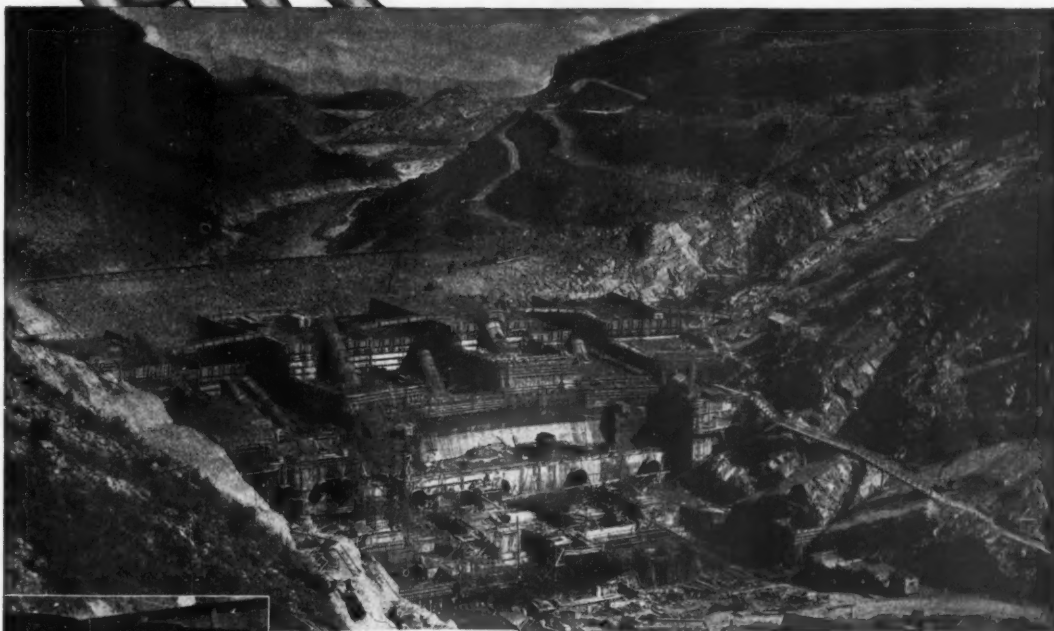
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Material Handling Equipment Phone: Bishop 7-5300

SUPERIOR 4-STRUT COIL LOOPS

Behind the forms at
HUNGRY HORSE DAM



U. S. Bureau of Reclamation Photo



SUPERIOR 4-STRUT COIL LOOPS
on 1 1/4" bolts in place to provide
anchorage for the next lift of
Blaw-Knox cantilever forms at
Hungry Horse Dam, Montana.

It's one million down and two million cubic yards to go as concrete placing at rapidly rising Hungry Horse, world's third largest dam, shifts into high gear. Data from tests made by the Bureau of Reclamation satisfied the joint venture contractors, General-Shea-Morrison, that 1 1/4" strut coil loops as an imbedded anchor in a lean concrete mix would adequately support 25 sq. ft. of cantilever steel forms. Therefore, behind the forms yet playing an important role in the construction of Hungry Horse, you will find SUPERIOR 4-Strut Coil Loops being used with Blaw-Knox steel forms.

Coil Loops are only one of the many various types of Anchors, Form Ties and other concrete accessories which SUPERIOR's many years of know-how and dependability have produced to meet rigid job specifications.

For maximum efficiency, select SUPERIOR for your concrete accessory requirements and be assured of dependable delivery and the best in design, material and workmanship. Request a copy of our new 56-page Catalog 500.

SUPERIOR CONCRETE ACCESSORIES, INC.
4110 Wrightwood Avenue, Chicago 39, Illinois
Pacific Coast Plant: 2026 Livingston St., Oakland 6, Calif.
New York Office: 1775 Broadway, New York 19, N. Y.

Dynamite Storage On Penn Turnpike

On its Pennsylvania Turnpike extension job, Hunkin-Conkey Construction Co. is using about 8,000 pounds of dynamite a week. Naturally it wanted to buy the dynamite in large lots and take advantage of quantity-buying discounts as high as 35 per cent. But where to store these lots? The answer: two welded steel shipping containers called Transportainers, developed by Dravo Corp. of Pittsburgh, originally for steamship cargo handling.

The boxes have a capacity of 275 cubic feet and can handle a weight of 6 tons. They have skids so they can be dragged by tractors and lifting rings for moving by crane. The doors are fitted with locks. One-inch sheathing lines the metal floor and walls to prevent sparks from the contact of shoe nails and lessen the impact of stray bullets in hunting areas. The boxes are weathertight and can be stored in the open. Incidentally, the contractor keeps his valuable tools in a third Transportainer.



Lined with 1-inch sheathing, this welded steel Dravo Transportainer, with a capacity of 275 cubic feet, is one of two used by Hunkin-Conkey Construction Co. for dynamite storage on field projects.

Bulldozer and Ripper For Wheel-Type Tractor

Literature describing two important attachments for industrial wheel-type tractors has been prepared by Arrow Mfg. Co., Box 4120 South Denver Station, Denver 9, Colo. This literature covers the Arrow reversible-blade snowplow-bulldozer, designed especially for use with Hough Payloaders, and the Arrow rippers.

The hydraulically controlled dozer has a blade length of 11 feet. The literature suggests its use for snowplowing and clearing roads and work areas. An illustration of the unit and specifications are provided.

The literature on Arrow rippers includes specifications of the three sizes available. These hydraulic and cable-controlled rippers vary in weight and horsepower requirements. The units are illustrated and fully described.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 720.

How Weather Engineering Can Save You Time, Money

The story of weather engineering for the construction industry is told in a new 12-page booklet prepared by Weathercasts of America, 611 Olive St., St. Louis 1, Mo. Because of the tremendous influence of weather in construction, and its relation to the profit-and-loss column of a construction firm, this bulletin should be of great interest.

We all know how concrete, mortar, equipment, and materials are affected by temperature; how rain can complicate excavation, paving, and compaction, and tie up costly equipment; how high winds may topple forms and damage costly equipment. The company points out in its booklet that advance weather warnings permit careful scheduling of work, canceling or reassigning of crews, and protecting of work and progress—that weather service can save thousands of dollars.

The booklet tells the history of Weathercasts of America, describes its initial formation, and lists the services it offers. Unlike general forecasting, the weather analyses offered by this company are pin-pointed projections of the factors, and areas, of major interest to each individual client. Degrees of cloudiness, rain, wind, and temperature, and geographical areas established by the client's work, are the guidepost of this organization. The booklet also indicates the degree of accuracy that may be expected from the company's reports and the basis upon which cost is predicated.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 726.

Richkraft Names Smith

The Richkraft Co., Chicago manufacturer of building papers and reflective insulation, has appointed Herman L. Smith General Sales Manager.

the new *Detection*

PIPE LOCATOR

"The Greatest Improvement in Years"

MODEL 505

Consider these Features:

- Matchless Performance
- Unparalleled Circuit
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- Metal Case—Modern, Smart
- Greater Depth—Simpler Control
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- All these and many more at a

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FOR YOUR MINING & STRIPPING OPERATIONS

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BUCKETS



3/8 TO 40 CUBIC YARDS

Easily renewable Manganese Steel Shoes for bottom runners and corner wearing plates... those parts that take the brunt of abuse... are standard equipment on all HENDRIX TYPE "HS" Heavy-Duty Buckets.

HENDRIX
Lightweight
DRAGLINE BUCKETS

Because Hendrix Dragline Buckets are low in upkeep and long in life, they represent extra value and economy in your digging operations. Because they are engineered to "take it," even on the toughest jobs, they insure full production. Because replacement parts are quickly and easily installed, maintenance costs are kept down to a minimum.

HENDRIX "HS" Heavy-Duty Buckets are widely used for stripping coal and for moving shale, rock, or any hard formation.

For descriptive literature ask your dealer or write

HENDRIX MANUFACTURING CO., Inc.

MANSFIELD - LOUISIANA

Road Curves Reduced, Roadbed Muck Blasted

Troublesome Muck Removed by Blasting on 4.3-Mile Job in New Hampshire; Pavement Is Surface-Treated Gravel

• THE longest single road improvement on the 1950 construction schedule of the New Hampshire Department of Public Works and Highways was a 4.3-mile stretch on State Route 10 in the vicinity of Croydon in the western part of the state. This bituminous-treated gravel-surface highway job involved heavy grading in the straightening of some sharp curves, and the removal of muck where the roadbed had been subject to frost heaves. The reconstruction was done by Thomas W. Watkins & Son, Inc., of Amesbury, Mass., under a low-bid contract of \$209,450.72. Work started in June, 1950, and was completed with the exception of a small amount of cleanup by the end of the year.

This improvement on Route 10, the Dartmouth College Road, begins at Croydon Flat and continues north through the village of Croydon to a point about ½ mile south of the Grantham-Croydon town line. The alignment of the existing 18-foot surface-treated gravel road was marked by several sharp curves. Near the middle of the project the highway runs close to Spectacle Pond where most of the muck excavation was centered. Ledge rock was encountered at several locations along the project.

In the construction the old alignment was followed as much as possible except where the curves were reduced. The new pavement, at 21 feet, is 3 feet wider than the old, and has a 2¼-inch crown. It is flanked by 5-foot shoulders, and the ditches in the cuts are 4 feet out from the edge of shoulders. In fills up to 7 feet in height the side slopes are 4 to 1; where the fills are higher, the slopes are 1½ to 1. All dirt cuts have 1½ to 1 slopes, while in the ledge rock the slopes are 1 to 2.

Excavation

The major grading items included 94,500 cubic yards of earth roadway

excavation, 7,300 yards of ledge, and 25,000 yards of earth borrow. The maximum cut was 40 feet in depth, and the maximum fill 40 feet high. Fills were placed in 12-inch lifts. A \$9,000 piece of the contract covered the moving of three buildings off the right-of-way, which was attended to before the earth-moving got under way.

For the excavation the contractor moved in two of his own shovels—a 1½-yard K360 Link-Belt and a 1¾-yard Thew-Lorain 80. For a time he also used another K360 Link-Belt 1½-



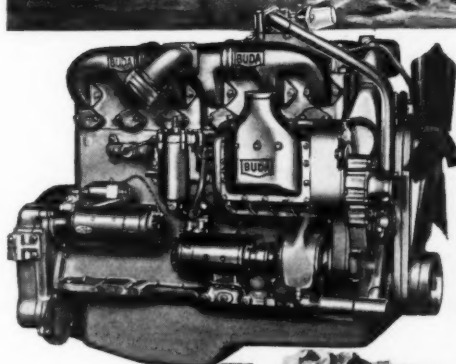
C. & E. M. Photo

In a gravel borrow pit near the Croydon, N. H., road-improvement project, a K360 Link-Belt Speeder 1½-yard shovel loads a Sterling truck.

yard shovel. Material was moved in 2 end-dump Euclids holding 11 yards, 10 Sterling 5-yard trucks, and 6 assorted hired trucks averaging 4 to 5 yards. A Unit ¾-yard trench hoe handled the digging of trenches for the drainage

pipe which included 4,772 linear feet of reinforced-concrete pipe, 12 to 72 inches in diameter; 654 linear feet of bituminous-coated corrugated-metal pipe, 8 and 15 inches in diameter; and

(Continued on next page)



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BUDA
dyna-swirl
DIESELS



Power your earthmoving equipment with the new Buda Dyna-Swirl Diesels and increase production of your "pay-off" units up to 25%.

Buda Diesels give you 15-20% extra power to haul heaped loads—10-15% extra torque to make faster round trips... factors that add up to more profits on every earthmoving job.

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6 DA-779	185	540	779
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6 DAS-844*	280	780	844
8 DA-1125	287	825	1125
8 DAS-1125*	350	1040	1125
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Lower
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automatically protects tractor exhaust systems from damaging rain, sleet and snow...

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3 SIZES FIT ALL EXHAUST PIPES FROM 1½" to 4¼"

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NO. 4 CANCAP - fits all exhaust pipes from 3¾" to 4¼" -----\$2.75 ea.

Road Curves Reduced, Roadbed Muck Blasted

(Continued from preceding page)

6,588 linear feet of 6-inch bituminous-coated perforated corrugated-metal pipe underdrain.

Another major grading item was the 51,500 cubic yards of gravel that was laid as a base course with a thickness varying from 12 to 32 inches, and extending the full width of the roadway. The minimum 12-inch depth was placed in fill sections; in the cuts the depth of gravel was increased to as much as 20 inches in the ledge sections. The maximum 32-inch thickness of gravel went into that stretch of roadway from which the muck had been removed.

Ledge Rock and Muck

On the ledge rock, blast holes were drilled with a Sullivan wagon drill powered by a Chicago Pneumatic 315-cfm air compressor and three jackham-



C. & E. M. Photo

Jackhammers—an Ingersoll-Rand in the foreground and a Worthington in the background—drill blast holes in subgrade rock on the Watkins & Son job. A Worthington 210-cfm compressor on a White truck supplies air.

mers—Ingersoll-Rand, Worthington, and Chicago Pneumatic—with air supplied by a Worthington 210-cfm com-

pressor mounted on a White truck. The holes were charged with Atlas 40 per cent dynamite. In some places the hard-

pan was so unyielding that the excavation was speeded by dynamiting this material also.

On the grading operations each shovel averaged 1,000 yards of material moved in a 9-hour work day. Fills were leveled off and the cuts cleaned up by three Caterpillar D7 tractor-dozers which also compacted the embankments as they worked. Slopes were trimmed to neat lines with a Bucyrus-Erie 22-B dragline equipped with a $\frac{5}{8}$ -yard bucket at the end of a 40-foot boom. The rig worked along the roadway in cut sections, pulling loose material into the ditch line at the toe of slope.

The muck generally was limited to two locations. At one spot it averaged 5 feet in depth over a 100-foot section of roadway. This particular area had lost much of its liquid content during the dry summer months, and was excavated without too much difficulty by the trench hoe. At the other location near the edge of the pond, the muck was 8 to 10 feet deep over a 250-foot piece of roadway. This muck was moist and soft, and was covered with a layer of tough root mat.

Holes were pushed into the root mat with a stick, on 16-inch centers in rows 6 feet apart. One or two sticks of Atlas ditching dynamite were placed in each hole, and blasts were set off covering from 50 to 75 feet of roadway at a time. This broke up the root-mat cover, and ledge rock was end-dumped out over the area. As the backfill was placed, the muck was forced out at the sides, leaving a solid embankment resting on a hard stratum at the bottom of the muck layer.

Gravel Base and Surface

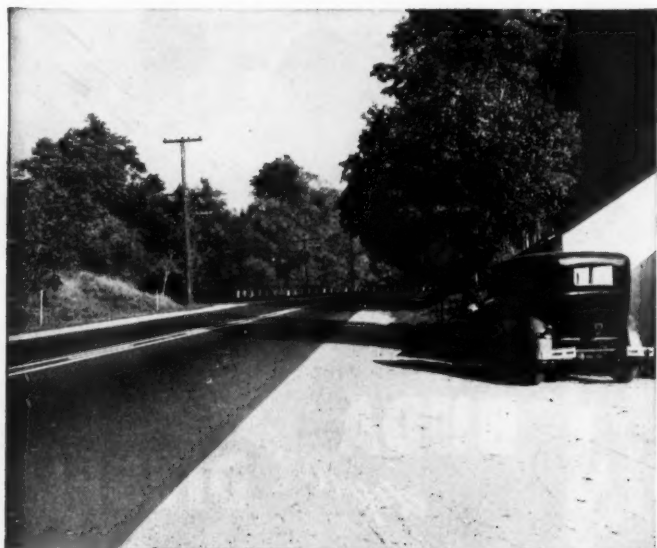
Gravel for the base course was obtained from local pits, with the greatest haul not over a mile long. It was moved by shovels and trucks, and shaped to final grade by a pair of motor graders—a Caterpillar 112 and a Galion 102. For every 100 linear feet of roadway, an average of 123 cubic yards of gravel was required for a 12-inch base course extending out through the shoulders. This volume increased to 321 yards of material when the maximum depth of 32 inches was laid for the base.

On top of the base gravel went a 4-inch surface course of screened gravel 21 feet wide. This material averaged 26 cubic yards for 100 linear feet of

(Concluded on next page)

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YOU GET BETTER SERVICE WITH TARVIA* ROAD TAR...



Blending with every landscape and free from glare, roads built with Tarvia* road tar take the strain out of driving. They are self-healing under impacting traffic.



The heat-absorbing qualities of black roads built with Tarvia* road tar make them easier to keep open in winter, as snow and ice melt more quickly. And they are not affected by chemicals used to remove snow and ice.

because

- 1 Roads built with Tarvia* road tar improve with age. Occasional applications will renew the life of the surface, and replace worn-away material.
- 2 TARVIA road tar penetrates surfaces and binds together the underlying material. It thus makes possible the inexpensive use of local aggregates.
- 3 Less TARVIA road tar is required because there are less solvents to be evaporated before the binder becomes effective.
- 4 TARVIA road tar is unaffected by gasoline, kerosene, or moisture. It retains its original properties.
- 5 TARVIA road tar holds the aggregate tightly in the surface, and produces a gritty surface which is lastingly skid-resistant.
- 6 TARVIA road tar may be applied at moderate temperatures, and with ordinary equipment.

The Barrett field man is always at your call for expert practical advice.



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All widths, lengths, and thicknesses; accurately punched to fit your make of machine.

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MANUFACTURING COMPANY
Established 1854
BUCYRUS, OHIO

roadway, and conformed to the following gradation requirements:

Sieve Size	Per Cent Passing
2-inch	100
1-inch	60-85
¾-inch	25-70
No. 200	0-5

The gravel was obtained from two pits, one at the north and the other at the south end of the job. A Thew-Lorain 75A 1¼-yard shovel dug the material, which was processed in a Pioneer screening plant before being hauled to the road. There it was spread by the motor graders and compacted by a Buffalo-Springfield 10 to 12-ton 3-wheel roller. The surface gravel was next treated with T-4 tar put on in two applications of 0.5 and 0.25 gallon to the square yard respectively. For 100 feet of roadway 175 gallons of bitumen was required. A light covering of sand was spread on by mechanical spreaders after each application of the tar, thus completing the paving operations.

Quantities and Personnel

The major items in the 4.3-mile surface-treated-gravel contract included the following:

Explosives for muck removal	2,800 lbs.
Earth excavation	94,500 cu. yds.
Ledge excavation	7,300 cu. yds.
Earth trench excavation	6,300 cu. yds.
Ledge trench excavation	600 cu. yds.
Earth borrow	25,000 cu. yds.
Gravel	51,500 cu. yds.
Gravel surface course	9,700 cu. yds.
Bituminous surface treatment	42,000 gals.

Thomas W. Watkins & Son, Inc., employed an average force of 50 on the contract under the direction of Tom Watkins, Superintendent; Carroll Thomas, Assistant Superintendent and Engineer, and Carroll Smith, Grade Foreman.

For the New Hampshire State Highway Department, L. C. Hambleton was Resident Engineer assisted by Ray Desmarais. The Department is headed by Gen. F. D. Merrill, Commissioner, with John O. Morton, Deputy Commissioner and Chief Engineer. Robert H. Whitaker is Construction Engineer.

How Wood Can Replace Steel

Recent curbs on the civilian use of steel have brought lumber even more to the fore as a building material. For many structural purposes it is replacing steel now being diverted to the essential production of military arms and equipment. As a guide in preparing various building designs, the Timber Engineering Co. has reissued its 116-page text called "Typical Designs of Timber Structures".

The book points out that the use of lumber in place of structural steel is made possible by timber connectors—pressed-steel rings or malleable-iron plates ranging from 2½ to 4 inches in diameter. When the rings are placed in circular grooves between adjacent faces of overlapping timbers, they provide a larger supporting area than is possible with other joining methods. They serve to spread the load on a joint more equally over the cross section of the wood and thereby bring more fully into play the structural strength of the timber.

This book may be obtained without cost by writing to the Timber Engineering Co., 1319 18th St., N. W., Washington 6, D. C.

Latest Flintkote News

In the critical cotton situation, The Flintkote Co., New York, has found it necessary to stop processing cotton fabric reinforcing for its asphalt coatings, used in waterproofing, roofing maintenance, and tank and pipe protection. However, it will distribute Glasfab membrane for use with the coatings. The membrane is made with Fiberglas yarn woven into mesh fabric and treated with asphalt; it is said to be heat and rot-resistant and immune to dampness. Widths range from 2 to 36 inches; rolls are 50 yards long.

Incidentally, the company has opened an office in Room 1018 in the Cafritz Bldg., 1625 I St., N. W., Washington, D. C., for its Industrial Products Division. Hayden A. Glatte heads the new office.

Wire-Line Grooving And Spooling System

A new wire-line grooving and spooling system has been developed by LeBus Rotary Tool Works, Inc., Box 2352, Longview, Texas, to cut the cost and improve the performance of wire lines. This system is said to prevent pinching, squeezing, crowding, and mis-shaping the wire line.

When the LeBus grooving and end fillers are used, the first layer of wire line is properly wound on the drum. The cross-over for successive wraps always comes at the correct place, the company says. End fillers placed against the flanges will eliminate the gap that occurs on flat drums. The controlled

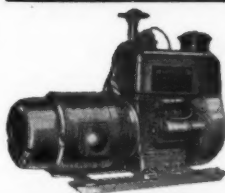
contact and even load obtained with this system result in longer life and safer operation, according to the manufacturer. The system may be installed on a hoisting drum in the field, factory, shop, or yard. It requires from 8 to 16 hours' time. Standard sizes are carried in stock.

Further information may be obtained from the company, or by using the Request Card at page 16. Circle No. 810.

DeWalt District Manager

O. Stanley Swandahl is now a district manager for DeWalt Inc., Lancaster, Pa. He directs the sale of the company's line of cutting machines in the Wisconsin trading areas of Green Bay, Oskosh, Madison, Milwaukee, Racine, Sheboygan, Appleton, Fond du Lac, Janesville, and Kenosha, and in Lake County, Ill.

SAVE 1/3 ON PORTABLE ELECTRIC PLANTS



New Winpower Portable Plants, powered with heavy-duty Wisconsin engines save you approximately 1/3 on purchase price. Especially designed for contractor use, with full range of sizes, 300 to 10,000 watts. Quality built for 25 years—famous for long, dependable service. Write today for free literature and prices.



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Operators Know . . . the

LULL Shovel loader

is

SAFER TO OPERATE

SAFER

from MOVING PARTS
and FALLING ROCKS

WOULD YOU like to operate a loader which required you to sit directly between the working lift arms? Of course not! Neither would operators. They too know the danger of falling boulders and moving arms.

● SIT IN SAFETY in the LULL SHOVELoader . . . designed for maximum operator safety.



THE LULL LOG LIFTING FORK, like all other LULL attachments, has the same LULL safety design as the SHOVELoader. Even with the high lift of the lifting fork, the operator is well clear of falling logs and moving arms. Log stacking can be dangerous but not with a LULL LOG LIFTING FORK.



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AND ATTACHMENTS**

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City..... 4..... State.....



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Designers and Builders of
The Largest Line of Allied Equipment
for Industrial Wheel Type Tractors

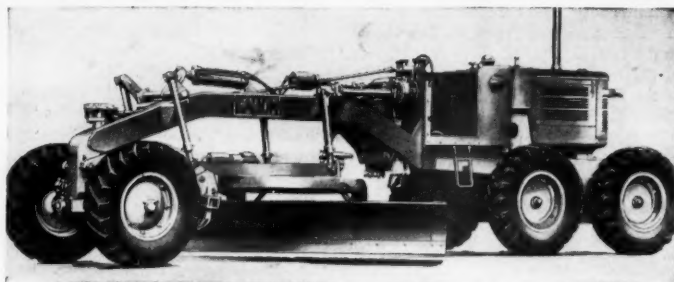
SHOVELoaders • UNIVERSAL Loaders • FLUID-DRIVEN SWEEPERS • LULLDOZERS • SHOULDER MAINTAINERS

A New Screwdriver

A new air-operated screwdriver, featuring a three-finger adjustable clutch with slip-impact action for final tightening of the driven screw, has been developed by the Cleco Division of Reed Roller Bit Co., Houston 1, Texas.

The Cleco 9SPF-10B has a capacity of ¼-inch bolts and screws. A grip throttle controls operating speeds up to 1,000 rpm. The tool is 8¾ inches overall and weighs 2¾ pounds. Since the distance from the side to the center of the spindle is 1½ inches, the tool can be used in tight places. It can be converted from a screwdriver into a nutrunner in less than ½ minute without the use of special tools, the company says. Finders and bits can be readily changed without dismantling any part of the tool.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 796.



A constant-mesh transmission designed expressly for heavy duty features the new Galion Model 104 motor grader.

A New Motor Grader

A new addition to the Galion line of motor graders, the Model 104, has been announced by The Galion Iron Works & Mfg. Co., Galion, Ohio. It features a new transmission of the constant-mesh type, designed specifically for heavy-duty motor-grader operation.

This compact transmission is said to permit smooth, easy gear shifting. Only one lever is needed for all shifting—either forward or reverse. Six overlapping forward speeds provide a range of 1.1 to 20.1 mph. Galion points out that the high reverse, 8.4 mph, permits fast operation without turning the machine around.

Listed as standard equipment are a combination of hand steering with hydraulic booster, and large front tires of the same size as the rear tires. A hydraulic shiftable moldboard is available as extra equipment to facilitate blading; it provides a maximum extension of the blade 97 inches beyond the rear tires with a 12-foot moldboard. Weight of the grader is from 21,840 pounds up, depending on extra equipment.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 706.

Prestressed-Concrete Slabs

A new catalog describing precast prestressed-concrete slabs for floors and roofs has been prepared by The Flexicore Co., P.O. Box 825, Dayton 1, Ohio. Diagrams illustrate how Flexicore slabs are used. A simplified load chart is also provided.

The 8-page folder explains how prestressing the slabs permits heavier loads on longer clear spans. These units, the company points out, also provide new ways to install heating systems, including hot-water radiant and warm-air split systems that combine circulating air with a radiant floor. Tables of sizes are given along with specifications and on-the-job photos.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 809.

Anti-Rust Product

A new addition to the line of No-Rust compounds has been announced by Gulf Oil Corp., 722 Gulf Bldg., Pittsburgh 30, Pa. The company recommends No-Rust No. 6 for protection of indoor or outdoor metal surfaces against corrosion.

This rust preventive is of the thin-film type and will provide approximate surface coverage of 390 square feet per gallon. It has no tendency to settle or separate in storage, the company reports; when once applied and dried, it will not crack, chip, scale, or disintegrate at temperatures down to 0 degrees F; nor will it flow at temperatures as high as 190 degrees F, the company reports. Gulf No-Rust No. 6 can be brushed, sprayed, or dipped on, and is removed with Stoddard solvent, kerosene, or similar petroleum solvents.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 764.

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Available for Cats, International and A. C. Tractors

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Worthington-Ransome 3½ cubic foot tilting mixers

NO OTHER MIXERS CAN MATCH THEM FOR:

- easy towing
- uniform mix
- easy handling
- long life

These sturdy members of the Worthington-Ransome Blue Brute family are as tough as they come. And a dozen features make them a joy to handle and cost-cutters for years to come. For example:

- a. no extra steps—all controls on working side
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- c. spindle of pressed-steel bowl rides on Timken roller bearings
- d. finger-tip control of tilt lock
- e. coil-spring-mounted axle, wheels equipped with Timken tapered bearings to eliminate road shock

See your Worthington distributor for a closer look at these rugged 3½-S tilting mixers. Write for free Bulletin to Worthington Pump and Machinery Corporation, Construction Equipment Sales Division, Dunellen, N. J.



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DIXIE CUP COMPANY
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Improved Features Of New Truck Line

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OLIVE
CLIP

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Power, styling, brakes, steering, and comfort are among the 50 improved features of the new B-3 Series of Dodge Job-Rated trucks, according to a recent report of the Dodge Division, Chrysler Corp., Detroit 11, Mich. Gross vehicle weights in the new trucks range from 4,250 to 40,000 pounds, and gross combination weights up to 60,000.

Horsepower increases in some of the 8 engines powering the new Dodge truck line range as high as 20 per cent. Higher governor settings, redesigned fuel pumps, "hotter" spark plugs with improved moisture-proofing, large-capacity generators, a new high-torque starting motor, and efficient cooling systems are among engine improvements cited for the new line. The new Oriflow shock absorbers introduced on the ½, ¾, and 1-ton models are said to provide excellent ride control on all road surfaces. All brake cylinders now are anodized for positive protection against destructive rust and corrosion. A new Cycle-Bond molded tapered lining was developed to give the brakes smooth positive action, and to reduce the tendency to grab or squeal. The new lining is now used on all models not equipped with air brakes from the 1½-ton up. Lower loading heights on all models from the ½-ton through the 2-ton have been obtained by redesigning the rear springs.

The new Dodge higher-tonnage trucks feature twin carburetion and twin exhaust. Engine output on these trucks has been increased from 106 to 125.5 net horsepower on the R Model, and from 111.5 to 134.5 net horsepower on the T and V Models, Dodge reports. Greater axle capacities for higher GVW and GCW ratings are announced on many models. The GVW rating of the new Power-Wagon has been increased to 9,500 pounds. Stronger springs have been made available for extra-heavy loads. The cab and 8-foot express body are rubber-mounted to reduce noise and vibration. Wrap-around bumpers are designed to give the fenders more protection. Driver visibility has been increased by lowering the front of the hood line.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 733.

Test Data on Rust Control

Results of laboratory tests performed on Tinallium, a corrosion and rust-control compound, are available from American Sand-Banum Co., Inc., 9 Rockefeller Plaza, New York 20, N. Y. This product is designed for use on practically all basic materials, porous and nonporous; it exhibits rugged lubricating properties, and is nontoxic and harmless to personnel and equipment, the report states. It has a temperature range of 75 degrees F below zero to 500 degrees F above. Equipment used and the results of the tests are completely outlined, along with data on field service applications.

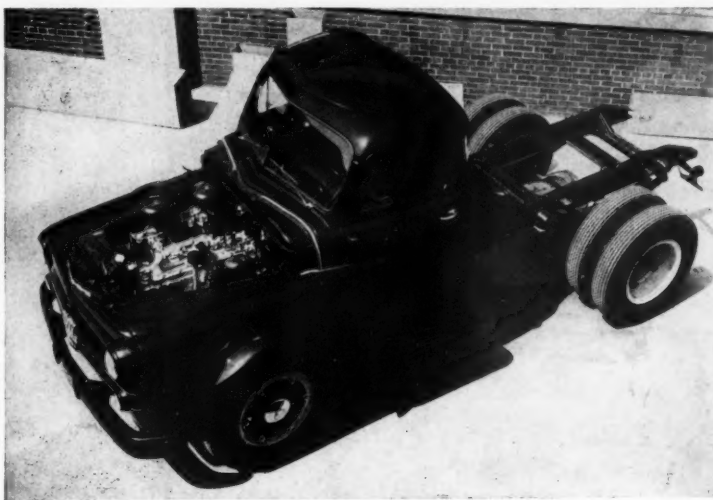
This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 752.

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CUNNINGHAM KANSAS



A new 331-cubic-inch-displacement engine produces a 20 per cent increase in the horsepower of the TA (3-ton) Dodge Job-Rated truck. The engine features twin carburetion and twin exhaust systems, and has three fuel filters, two oil-bath air cleaners, and two velocity governors.

Dravo and Beaver Win Safety Contest, West Pennsylvania

The Constructors Association of Western Pennsylvania held its 17th Annual Dinner in the Hotel William Penn in February, and presented awards to the winners in its 1950 Accident Prevention Contest for heavy and highway contractors in western Pennsylvania.

Winner in Division I, for large companies, was the Contracting Division of the Dravo Corp., Pittsburgh; winner in Division II was Beaver Asphalt Paving & Construction Co. of New Brighton, Pa.

A contest for superintendents and foremen of the companies entered in the competition showed that Dravo's D. P. Childress supervised 280,686 man-hours during 1950 with no lost-time accidents; Beaver's William Hollinback had a record of 16,900 man-hours with no lost-time accidents.

The Honorable Joseph R. McCarthy, United States Senator from Wisconsin, was the guest speaker at the dinner.

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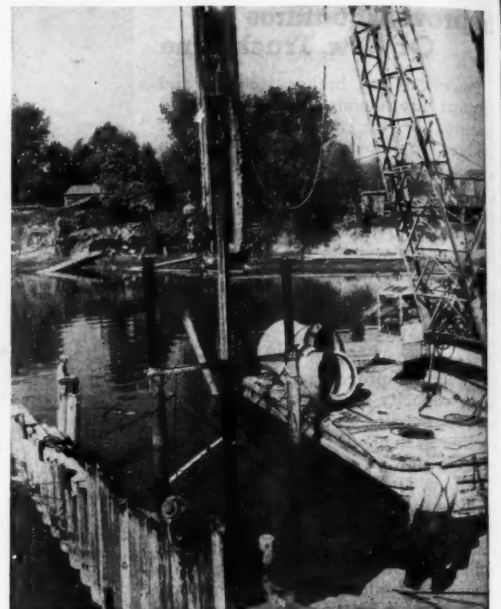
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This photo and the one next to it show a Colby barge-mounted crane mucking a trench for the pipeline in Columbia Slough, and a pile driver putting down foundation piles for a trestle to support the pipe.



Sewage Pipeline Laid Under Water

By RAYMOND P. DAY,
Western Editor

(Photo on page 1)

• PIPELINE work is never easy.

That statement holds true even on dry-land lines, but it is especially so when pipelines dive under water for long distances. When many of the pipeline sections weigh 26 tons, when the line is 45 feet under the water surface, when it has to be laid on a narrow pile trestle driven and cut off to hairline elevation tolerance, the job is what the waterfront stiff calls a bearcat.

General Superintendent Walter Peterson of Manson Construction & Engineering Co., of Seattle, was introducing a "bearcat" as he explained somewhat ruefully, "I had to rig up for this one about three times as heavy as we thought would be necessary."

Peterson was standing on the bank of Columbia Slough, about 3 miles northwest of Portland, Oreg., as he explained the interesting underwater sewage-line installation his company has under way for the City of Portland. The \$750,000 contract will, by June of this year, bridge Columbia and Oregon Sloughs with 54 and 72-inch concrete pipe. A 700-foot section of 84-inch pipe will extend far out into the main Columbia River to a discharge structure. The job will connect the ends of about 3 miles of tunnel, previously built, and the new 150-mgd sewage-treatment plant Portland had to build to reduce one of the worst water-pollution situa-

Columbia River Sloughs Are Deepened and Crossed as Marine Contractor Helps Portland Whip Pollution

tions in the Pacific northwest. Altogether there is 4,500 feet of pipeline in Manson's contract.

Problems which Peterson and his crew whipped were numerous. They

had to cut an underwater trench across both sloughs to bury the pipe, and they had to hold the banks from caving. They had to build concrete pipe to extremely accurate tolerance, deliver it

to the river bank, load it on barges, and lay it far underneath the water so the finished line would be watertight.

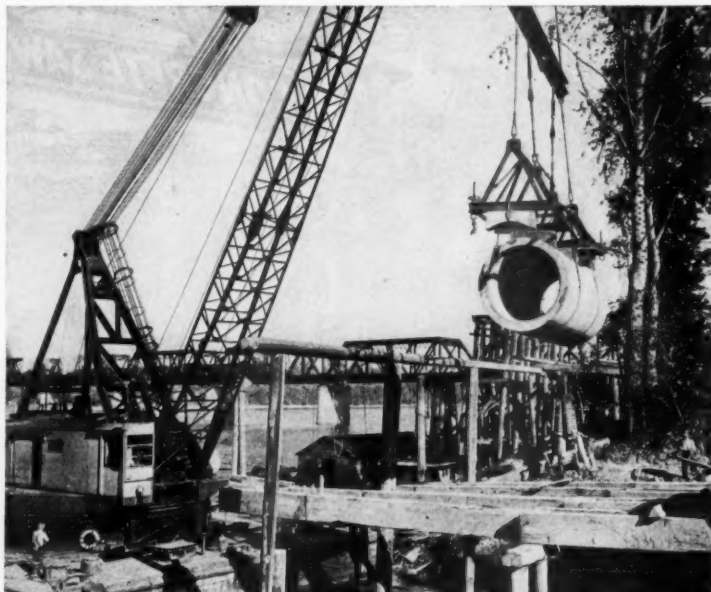
Trench Excavation

A tricky underwater formation of sand and clay, with treacherous layers of soft ooze, made the excavation of a trench extremely difficult. At Columbia Slough, a Colby 200 barge-mounted crane picked up a 2-yard clamshell bucket to muck out the trench. The work immediately ran into difficulty, because a soft 8-foot layer of mud near the project grade line caused the banks to cave badly. A floating pile driver began to work nearby. Steel sheet piles long enough to penetrate about 5 feet below pipe grade went in, but the pressure from outside was still too great. They tied the top of the sheet piles back to deadmen on shore, but the cables drew hard and tight. A brace row of wood piles went in behind the sheeting, and that finally furnished enough strength to resist the pressure from running mud and sand.

The worst trouble in this regard always came near the shore lines, especially around the spots where the 120-foot Colby crane boom and its clamshell bucket had dumped superimposed loads on the marshy ground. Out in the middle of the slough the trench held up better, but even so, it was necessary to clam out about 5,000 cubic yards of material to expose the grade for the bottom of the pipe.

Oregon Slough presented a different

(Continued on next page)



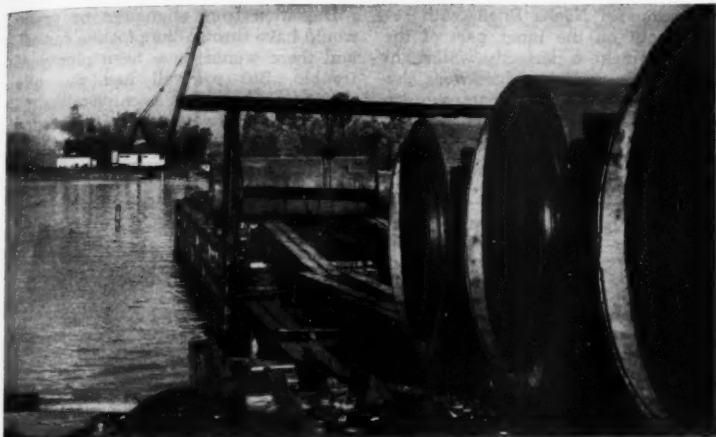
Pipe sections were trucked in to transfer barges, tugged out to the placing point, assembled, then lifted by an American derrick. Here a 54-inch section goes aloft.



The lifting strongback was so rigged that the entering end of the section would be carried slightly lower than the rest of the piece.



Walter McCray's divers stayed in the clear until the section was lowered to approximate grade; then they went down, worked it into place, and pulled the joint tight.



C. & E. M. Photo

This timber ramp solved one of the worst problems: handling pipe sections so they could be shipped out to the American revolving crane.



C. & E. M. Photo

This Chevrolet winch truck had plenty of power to slack the heavy concrete pipes down to the loading barge.

problem. Oregon Slough was wider; much wider than Columbia Slough. The water was deep, and there was 150,000 cubic yards to take out. This excavation was subbed to General Construction Co., and a 24-inch hydraulic dredge owned by that firm made short work of the trench. Even so, the dredge ran into somewhat the same trouble, despite the fact that the material was carried nearly 3,000 feet and put ashore on an island.

The dredge had to make three passes before the material finally stopped running to the center. When the sand settled down to its natural angle of repose, the trench was nearly 450 feet wide across the top.

Pile Driving

Since the concrete pipeline with its load of sewage was too heavy for foundation soil to support, a pile-and-timber trestle had to be constructed to close tolerance. The piles were all wood, from 20 to 70 feet long, and were driven in 3-pile bents 8 feet on centers.

A floating pile driver, with steam power and a No. 1 Vulcan hammer, moved in. Some method had to be rigged to drive piles far underneath the water. Manson's Superintendent Walter Peterson made a 3-pile template out of old 24-inch water pipe, braced it thoroughly with welded X-angles, and put lifting eyes on the contrivance so the pile driver could handle it easily.

With the template in place, spotted by targets and checked by a transit, the center pile was entered and belled

under the hammer. It was then driven down to the top of the template. A long H-beam follower was then in-

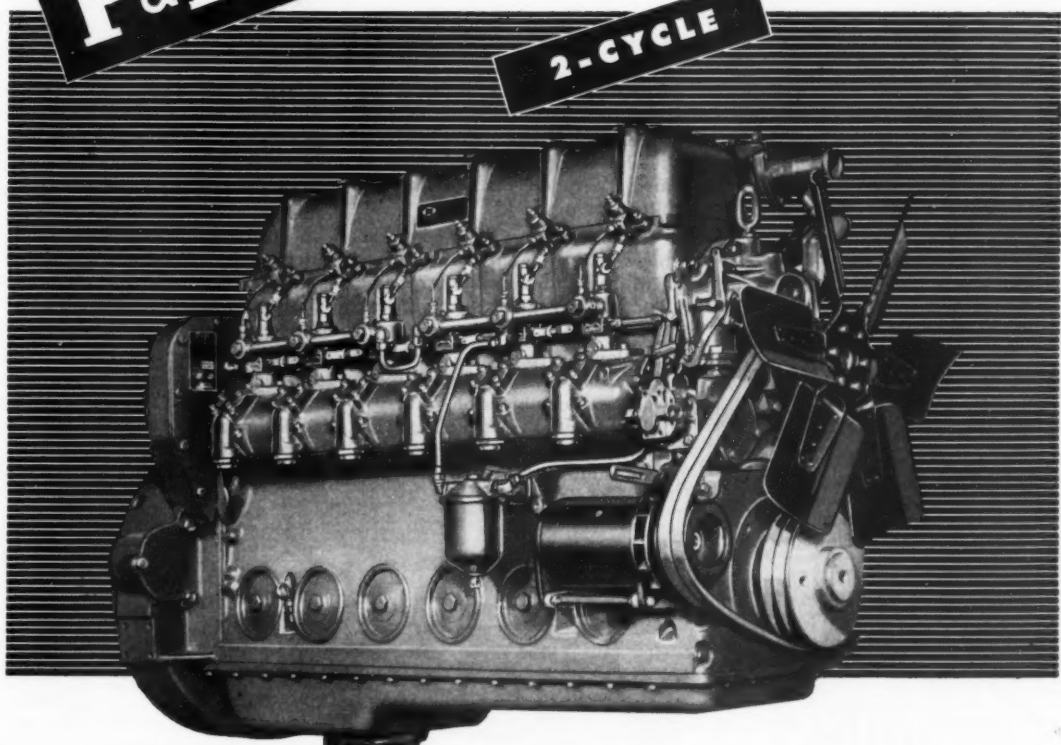
stalled, and the pile was driven close to grade. Permanent, driven platforms

(Continued on next page)

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Sewage Pipeline Laid Under Water

(Continued from preceding page)

out in the sloughs made it possible for surveyors to shoot grades as pile driving progressed. Grades had to be established to no tolerance so the pipeline would have solid bearing. They were marked off on the pile bents with the aid of divers, and the piles were then cut off very carefully to those marks by divers, who used a Mall pneumatic power saw for the work.

Douglas fir caps, 12 x 12, were then floated in, weighted down from the surface, and drift-pinned to the pile tops. Air guns did that work. The fir wedges on both sides of the pipe were not put in until after the pipeline was placed. It was customary for the pile-driving and diving crews to finish about 7 bents per shift, well in advance of pipe installation.

Pipe Placing

Manufacture of the concrete pipe was subject to American Pipe & Construction Co., whose Portland yard was busy for weeks filling the order. Male and female ends were equipped with American's patented rubber-gasketed steel joint. The 84-inch line was fabricated in 20-foot sections, while 54 and 72-inch pipe came out in 16-foot pieces. The pipe was delivered one piece at a time by trucks from St. Johns Motor Express.

Peterson rigged a timber ramp so concrete pipe would easily be loaded on barges. A pile trestle was built, with longitudinal 12 x 24-inch fir-timber ways. The trestle sloped toward the Oregon Slough, terminating in a ramp which could be raised or lowered by chain hoist to correspond to the elevation of a barge, regardless of the stage of the river.

Two pipe-transfer barges, each equipped with a gasoline winch, were rented from Willamette Tug & Barge Co. The barges were entered head-on under the trestle, and tied. The pipe sections were then rolled on the barge by means of cable held two ways. The barge-mounted hoist held a strain one way, while a Chevrolet winch truck controlled the pipe from shore. It was easy to load one barge while the other was out at the placing crane.

Loaded barges were taken to the placing point by the small tug Judy.

The Oregon Slough crossing was especially well organized, with rigging to lay two pipe sections at once.

Two pieces of pipe were first assembled on the surface barge. Then a lifting strongback, with four cable straps underneath, was made fast. The lifting device was so rigged that the entering end of the section would be carried slightly lower than the rest of the piece. The 8-part line on the powerful American derrick handled the ponderous section with ease.

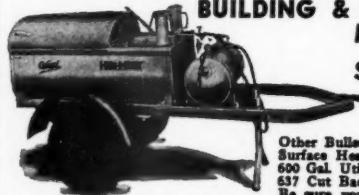
Walter McCray's divers stayed in the clear until the section was lowered to approximate grade. Several times the divers, when they went down, found the pipe ends partly entered, so proficient had the crews become. Divers then worked the section in place with the aid of a small surface winch on the diving barge. When the joint was pulled in tight, according to telephone signals from the diver, the derrick load line was slacked off completely. Joints were checked at the time of installation by feeling the clearance, and later

applications of Noahs Pitch, with cement grout on the inner part of the pipe, will make a perfectly watertight line. The fir-timber wedges were also installed and toe-nailed in to each cap to furnish additional support, as each section went in.

Deviation from alignment or grade would have thrown the pipeline far off, and there would have been plenty of trouble. But so well had the pile driving and grades been established that the underwater work proceeded

(Concluded on next page)

AEROIL HEET-MASTER KETTLES FOR ROAD & STREET BUILDING & REPAIR, NOW AVAILABLE IN 230, 330 & 500-GAL. SIZES



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Timken bearings take the heavy loads from any direction—radial, thrust and combination—because of their tapered construction. Line contact between rollers and races gives them extra load-carrying

capacity. True rolling motion and extremely smooth surface finish combine to practically eliminate friction. In addition, Timken bearings make tighter closures possible, which retain lubricant better, keep dirt out.

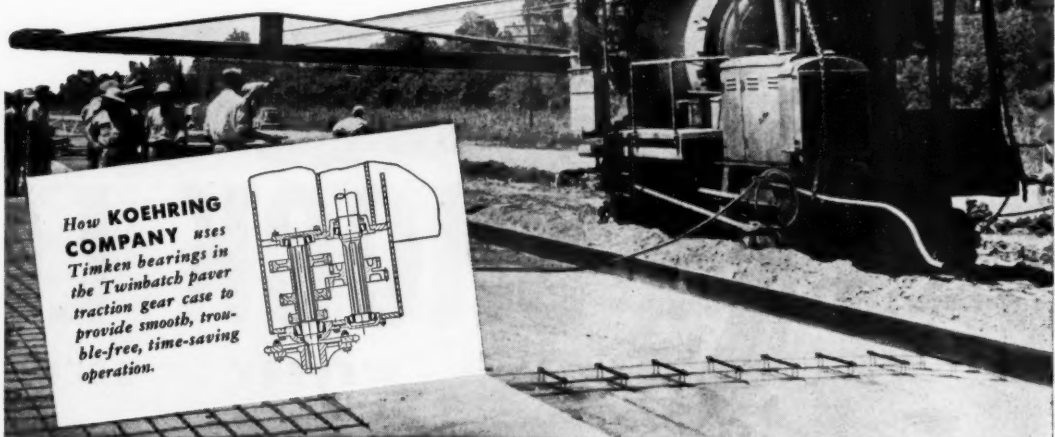
As a result, moving parts stay in positive alignment. Deflection and end-play are minimized. Parts operate better, last longer. Friction is reduced to a negligible amount. Maintenance man-hours and downtime are cut to the bone.

Make sure that every piece of road-building machinery you make or use is Timken bearing equipped. Look for the trade-mark "Timken" on the bearings. The Timken Roller Bearing Company, Canton 6, Ohio.

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without a hitch. In reality, the underwater lines are inverted siphons, since the ends at the sloughs terminate in surface tunnels previously built. Four small transition structures, under Manson's contract, will make that connection. The underwater lines are to be pumped dry, the joints finished inside and out, as a condition of final acceptance. By January of this year the pipe had been laid across Oregon Slough and the contractor was ready to unwater it and caulk it tight.

Single sections were laid across Columbia Slough, in approximately the same manner that Oregon Slough was bridged. Oregon Slough methods are to be used when the discharge line goes out into the main stream. The Colby clam will replace the 20-foot minimum cover over the Oregon Slough line, while the backfill over the remainder of the job will be dredged in.

Part of Big Program

Manson's work is but a part of Portland's sewage program which is designed to alleviate one of the worst water-pollution problems in the Pacific northwest. For several years, pollution in the Willamette River had reached an all-time peak. Construction of treatment facilities, financed by bonds Portland's citizens voted, should go part of the way toward cleaning up the stream.

Over 3 miles of sewage tunnel has now been finished, and work is drawing to a close on the new 150-mgd treatment plant. The treatment site is sufficiently large so additions can be made to the plant when more complete treatment is desired in the future.

One of the cost-cutting features of the treatment plant is the use of parallel reinforced-concrete venturi tubes, rather than metal tubes or other more expensive flow-measuring devices, to measure the sewage inflow. Each venturi in 9 feet tapers from 5.5 x 4.5 feet to 3.5 x 2.0 feet, with piezometer taps near the ends of the tapered section.

Personnel

Ben S. Morrow, Chairman of the Portland Engineering Board, is in general charge of the project. Other Board members are John W. Cunningham and J. C. Stevens. L. G. Apperson, Portland City Engineer, supervises the engineering features, with Dan Curran as Project Engineer for the City of Portland.

For Manson Construction & Engineering Co., Walter Peterson is General Superintendent, with Clyde Sherman as Project Engineer and Office Manager. Art McCray is in charge of diving, with Al Larkin and Arnold Malley supervising the two spreads of pipeline construction.

Diesel Engines on the Job

Thirty-one illustrations of Cummins diesel engines powering the production of crushed stone, agricultural lime, sand, and gravel, are displayed in a new 8-page leaflet issued by Cummins Engine Co., Inc., Columbus, Ind. A brief description of each job captions the photographs. Applications of the diesel-powered source for hauling, loading, crushing, pulverizing, and dredging work are included. Brief specifications of each of the units designed for these purposes are given on the last page of the booklet.

This literature may be obtained from the company by requesting Bulletin No. 5314, or by using Request Card at page 16. Circle No. 814.

LeTourneau Field Engineers

James W. O'Connor and J. W. Gullede have joined the field engineering staff of R. G. LeTourneau, Inc., Peoria, Ill. O'Connor was at one time with the Massachusetts Department of Public Works, and Gullede with the California Division of Highways.

A Filter Cartridge For V-Type Engines

In line with the movement into a defense economy, where protection and preservation of existing machinery is of great importance, Wisconsin Motor Corp., 1910 S. 53rd St., Milwaukee 14, Wis., in collaboration with Wix Accessories Corp., announces a new filter to match the lubrication system of the V-type 4-cylinder Wisconsin air-cooled engines. The filter adds extra hours of dependable service to the life of the engine, the company explains, by keeping the oil free from dirt, filings, and sludge that accumulate in the crankcase.

The Micro-Fine oil-filter cartridge is a combination of two filtering mediums: virgin cotton and plastic-impregnated wood cellulose. It removes solids of micron size, measuring less than 1/10,000 inch, and holds its own dry weight of acids, dirt, and filings, according to the manufacturer. The cartridge is said to fit perfectly on the

oil-filter base, assuring an oil seal that is vibration and leak-proof. The manufacturer recommends that the oil-filter cartridge be replaced after each 50 to 100 hours of engine operation, depending on dust conditions, to assure maximum engine protection and most effective utilization of oil.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 783.

Reynolds to Build in Texas

By the end of this year, Reynolds Metals Co. of Richmond, Va., hopes to have in operation a new \$80,000,000 aluminum-reduction plant in the Corpus Christi area, in San Patricio County, Texas, near Gregory. J. Gordon Turnbull, Inc., of Cleveland, will engineer and supervise erection of the facilities.



There's Always a BEST WAY

That goes for snow clearance, too. It's no mere accident that

DAVENPORT-FRINK SNO-PLOWS

enjoy engineer-preference throughout the snow belt. They have won their spurs through faster • Safer • Cleaner Snow Removal.

PLAN AHEAD

The best time to think about increased efficiency for next year is NOW. We'll gladly supply complete information.

ALL SIZES AND TYPES for TRUCKS • TRACTORS • MOTOR PATROLS

DAVENPORT BESLER CORP.

Dept. A

Made in Eastern U.S.A. by FRINK SNO-PLOWS, INC., 1000 Islands, CLAYTON, NEW YORK

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TURN YOUR PROBLEMS TO PROFITS

MIXERMOBILE EQUIPMENT

Ruggedly built to fit all projects, both large and small, the MIXERMOBILE trio means more jobs covered... reduced labor costs... savings in time and expense of moving heavy equipment. Each unit handled by a single operator travels at normal highway speeds and is adaptable to a wide variety of construction jobs.

SCOOP Model C

The versatile Model "C" with exclusive planetary drive for dependable power has 6 "quick change" attachments. Saves bringing in "extra" equipment. Three-quarter cu. yd. scoop is standard equipment.

- Transports, elevates and pours concrete.
- Shovels, loads, transports dirt or bulk materials.
- Lifts and places forms and timbers.
- Lifts heavy equipment.
- Reaches extra height.

ATTACHMENTS INCLUDE: Swivel-type concrete hopper. Scoops in 5 sizes. Lift forks. Special fertilizer or hay fork. Crane boom. Track extensions up to 26 feet.

2-YD. MIXERMOBILE Model M-7

This complete mobile concrete mixing and elevating plant eliminates costs of hauling and erecting expensive equipment. One man handles the entire operation—quickly "sets-up" ready for pouring... then controls every operation from dump truck to deck.

- Improved batch-timer and counter insures uniform mix.
- New electronic water meter gives unerring accuracy.
- Sturdy planetary drive hoist clutches.
- Mixes up to 50 yards per hour.
- Portable elevating and agitating storage plant for ready mix.



DUO-WAY SCOOP

Power-packed dozer at one end...scoop at the other. The Duo-Way is designed for top performance. Unit with 84-inch dozer blade, optional, at one end, and 1-cu. yd. scoop at the other end performs four operations—loader, dozer, truck and tractor.

- Dazes out, then scoops up dirt, lifts, transports and loads.
- Operator in sidesaddle seat has perfect vision and control.
- Rugged planetary drive for "extra" power.
- Improved hydraulic-controlled track and dozer.
- Complete assortment of attachments for versatility.

Write for literature and address of your nearest dealer.

We reserve the right to make improvements in design and specifications without notice.

MIXERMOBILE MANUFACTURERS

BOX 7527

PORTLAND 20, OREGON





Here's a close-up of the new Gilmer rubber and fabric belt with teeth. Note that it has positive engagement with the pulley. It will not slip, it permits split-second timing, and attains speeds up to 16,000 fpm, U. S. Rubber reports.

A Belt with Teeth For Power-Drive Use

A new advance in power transmission—a rubber and fabric belt with teeth—has been announced by United States Rubber Co., Rockefeller Center, New York 20, N. Y. Known as the Gilmer timing belt, it provides power drive which will not slip and permits split-second precision timing, the company says. In addition, it will attain speeds up to 16,000 fpm and operate quietly.

This product, U. S. Rubber reports, is designed to replace flat belts, V-belts, chain drives, and gears in hun-

dreds of applications. It can be manufactured in any desired size and in a variety of materials to suit specific applications. Other features claimed: it operates on fixed centers without take-up adjustments, it will not stretch, it needs no initial tension, it requires no lubrication, and speed ratios up to 30 to 1 are possible with it. The belt's flexibility permits pulley diameters as small as 1/2 inch at 10,000 rpm even with a heavy load, the manufacturer reports.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 730.

Mack, Wooldridge Team Up To Serve Western Contractors

Wooldridge Mfg. Co. of Sunnyvale, Calif., will partially produce and fully assemble off-highway vehicles made by Mack Mfg. Co. to fill the needs of western contractors, miners, and loggers. Plans are being rushed for the construction of a \$250,000 modern assembly plant in Sunnyvale. The two companies feel that producing and servicing for westerners in the west is the logical answer to the growing demands of heavy western industry. Wooldridge will also act as exclusive distributor for Mack's off-highway equipment in ten western states.

Catalog on Magnetos

An 8-page catalog on a variety of Super-Spark magnetos and battery ignition units has been prepared by the Magneto Division, Fairbanks, Morse & Co., Beloit, Wis. The magnetos illustrated are designed for single-cylinder, 2-cylinder, and 4-cylinder engines.

Also included are types for heavy-duty jump-spark distribution and special applications. A description, an illustration, and brief specifications are given

for each unit offered.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 746.

Lay bigger tonnage, yet cost 50% less Up to 12" thickness in widths to 11', lesser thicknesses to 12'6"



JAEGER Paver-Type Aggregate Spreaders

Cost half the price of bituminous pavers. Efficiently lay both base and surface aggregates, free-flowing bituminous mixtures, plant-mixed stabilized soil. Crawler or 4-wheel drive operates on subgrade, not on new-laid material. Two models, to work with all sizes of trucks.

Lay both base and top of parking areas, drives, secondary roads: Any free-flowing bituminous material or macadam surface.

See your Jaeger distributor or send for Catalog SP5-1

THE JAEGER MACHINE COMPANY 701 Dublin Avenue
Columbus 16, Ohio

BITUMINOUS PAVERS • CONCRETE SPREADERS, FINISHERS • COMPRESSORS • PUMPS • MIXERS

MK 288A



Down go steel piles to help build a new 4 1/2 mile subway—Canada's first—in Toronto. The contracting syndicate of Pitts, Johnson, Drake and Perrini selected a McKiernan-Terry Pile Hammer for the pile driving job.

Toronto's new subway is being built along its busiest thoroughfares, Front and Yonge Streets. To help support the heavy traffic on a temporary street surface, steel soldier piles were driven along both sides of the street by a McKiernan-Terry 9-B-3 Double-Acting Pile Hammer. The 12" x 12" H piles were hammered 20 to 40 feet into the ground with the steam hammer developing 8,750 ft-lb at 145 blows per minute. • This is another example of why hundreds of contractors choose McKiernan-Terry Pile Hammers for fast, accurate, economical pile driving. 17 sizes of hammers and extractors are available in the McKiernan-Terry line. Write for bulletin giving all the facts.

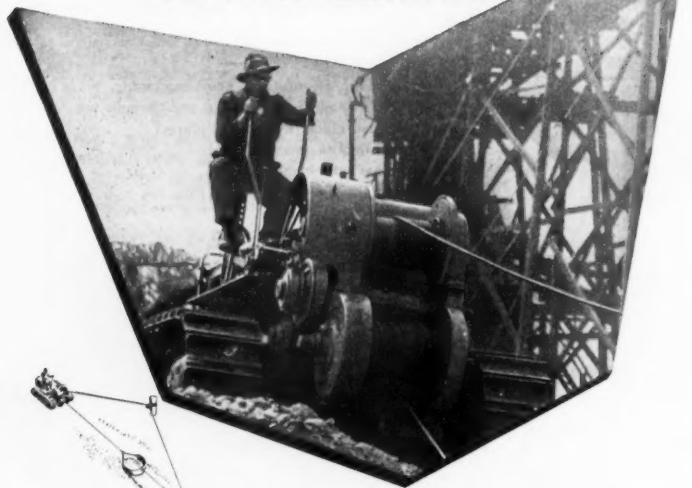
McKIERNAN-TERRY CORPORATION
Manufacturing Engineers
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Plants: Harrison, N. J. and Dover, N. J.

**McKIERNAN
TERRY**



Honing to 42" I.D.

CARCO WINCHES MULTIPLY TRACTOR EARNING POWER!



Drag-line earthmoving is just one of the dozens of extra jobs your tractor can do with a Carco double-drum winch. With no extra help or equipment and no lost time, you're ready for hoisting, dredging or loading. With any Carco winch you can clear land, move heavy machinery or stuck equipment, spot cars, reach out for a load that's inaccessible to the tractor itself. A Carco winch on the job speeds up the whole operation.

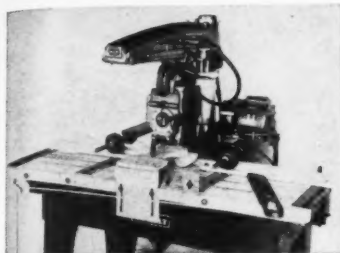
1st in Volume—
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CARCO
Winches for all makes of tractors

Because Carco builds more tractor winches than any other manufacturer, and for more makes of tractors, you're always close to a Carco dealer with parts, service, full data on any model.

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CANCER c/o Your Local Post Office



DeWalt's new Model GE 400 woodworker is a radial-arm machine which features safety power-feed unit.

Two New Woodworkers

Two new woodworking machines have been added to the line of power-feed machinery manufactured by DeWalt Inc., Lancaster, Pa. The new Model GE 400 (illustrated) is a standard radial-arm machine that features the DeWalt safety power-feed unit and the DeWalt custom table top. The GR 400 is a standard model with the same features.

The custom table of the Models 400 has a pressure arm, a spring hold-in, and a spring-tensioned hold-down. The table top permits the operator to run molding, to shape, rip, bevel-rip, tongue-and-groove, rabbet, and plough on the power-feed machine, DeWalt says. Each of the power-feed operations can be run continuously and without fear that the material will be scarred or chipped by the cutterhead, because the material is always held against the cutting tool by a constant pressure, the manufacturer states. The safety power-feed unit can be swung out of position when not required so that the machine can be used for cross-cutting, mitering, cross-dadoing, sanding, and other standard operations.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 712.

IRF Activities in 1950

In 1950 a new era of world highway development gathered momentum, with particular emphasis on roads and highway networks in relation to the economic and social progress of underdeveloped nations. The place of the International Road Federation in this development is described in two new booklets distributed by the Construction Industry Manufacturers Association which is one of the sponsors of the Federation.

The first reviews the 1950 loans made for road work by the Economic Cooperation Administration, the United Nations, the Export-Import Bank, and the International Bank for Reconstruction and Development. It describes IRF's cooperative and consultative status with these agencies, its fellowship programs, its publications, its radio and press publicity, its speeches and meetings. During 1950, IRF acquired 5 new national affiliates, 4 in the Western Hemisphere and one in the European-East area. It initiated activities in 12 countries and carried on organizing activities in some 20 other countries. This work is reviewed in "IRF in 1950, Staff Report".

The companion booklet, "How Your Investment in IRF is Paying Dividends in Mexico", is the first in an IRF series of case histories of Latin American countries. It explains in particular how the Mexican rural-road program is being financed; this program was inspired by IRF.

For copies of these booklets, address Construction Industry Manufacturers Association, Field Bldg., 135 S. LaSalle St., Chicago 3, Ill.

B&D Expands in Buffalo

On February 1 the Black & Decker Mfg. Co. opened a sales and service branch at 881 W. Delevan Ave., Buffalo, N. Y. The 4,100 square feet of floor space in the new building is an increase

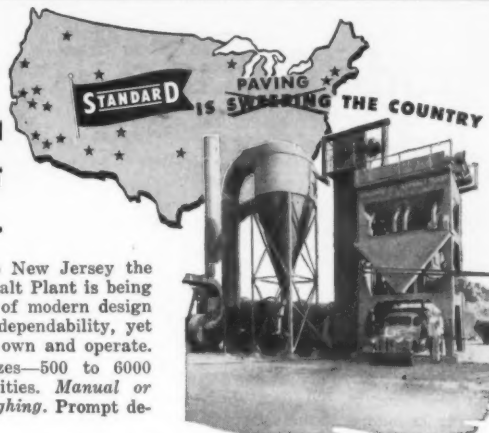
of nearly 400 per cent over B & D's previous Buffalo location. Complete service facilities—manned by factory-trained mechanics—plus a large stock of replacement parts and a show room are provided. J. F. Spaulding is Branch Manager.

Reversible Tooth Points

A pocket-sized circular on Page reversible center-shank tooth points can be secured from Page Engineering Co., Chicago 38, Ill. It includes illustrations, descriptions, and specifications on three types of points and two weld-on tips. These points, it says, are so designed that the bolt will not wear or tear loose from the joints. It stresses the fact that the points are made of the finest alloy to withstand heavy-duty service, and may be easily reversed or replaced when worn. Helpful hints for their use are included.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 753.

The MOST MODERN ASPHALT PLANT IN AMERICA...



From California to New Jersey the new Standard Asphalt Plant is being hailed as the acme of modern design—tops for rugged dependability, yet most economical to own and operate.

Unit built. 8 sizes—500 to 6000 pound batch capacities. Manual or fully automatic weighing. Prompt delivery.

Write TODAY, for full descriptive catalog.



STANDARD STEEL CORPORATION

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Which wire rope dollar buys the most service?

Isn't it true that when you purchase wire rope, you're actually buying service? Buying what the wire rope will do for you? Buying units of work?

The rope dollar that buys the most units of work has been wisely spent. Can you tell which brand of rope is giving you the most for your money? There are many users who can—by keeping records of wire-rope performance. They know what constitutes good, average service in terms of ton-miles, yards of rock

moved, etc. When a certain brand gives better-than-average service over a period of years, they know they're getting a big return on the dollars spent for that brand.

Their figures prove it. That's why Bethlehem urges the keeping of records—records that show rope costs per unit of work. For we feel that in any such comparisons, Bethlehem rope will stand out from the crowd... in a way that will please the user's pocketbook.



BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

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LET YOUR RECORDS TELL YOU!



Rhode Island Airport Adds Another Runway

5,500 x 200-Foot Reinforced-Concrete Strip Is Laid on a 6-Inch Base of Hard-Packed Stone, Stone Dust, and Sand

• RHODE ISLAND'S largest airport is preparing to accommodate increasing air traffic with the construction of a new reinforced-concrete runway 5,500 feet long x 200 feet wide. At present, Theodore Francis Green Airport has three concrete runways. One is 5,000 feet, while the other two are 4,000 feet long; all have widths of 150 feet. The field is located along U. S. 1 at Hillsgrove, City of Warwick, 7½ miles south of Providence, capital city of Rhode Island.

The improvement is a joint project

of the Federal Civil Aeronautics Administration, and the State of Rhode Island and Providence Plantations, Department of Public Works, Division of Aeronautics. The state agency awarded a contract for the work to the M. A. Gammino Construction Co. of Providence, R. I., on its low bid of \$1,197,716. The next lowest bid, \$1,309,319.50, was submitted by Campanella & Cardi Construction Co. of Hillsgrove, R. I. Included in the contract are items covering grading, drainage, and paving of the runway and bituminous-concrete



C. & E. M. Photo

Gammino workmen at Theodore Francis Green Airport, R. I., drive pins for B-K forms with an Ingersoll-Rand pneumatic hammer. An I-R compressor furnishes air.

connecting taxiways.

Laid out in a northeast-southwest direction, the new runway is parallel to and east of the existing 5,000-foot runway. Its pavement is of 8-inch uniform depth except for the 500 feet at both ends where the thickness is in-

creased to 10 inches. The job got under way in May, 1950, with the contractor's plan of operation calling for the completion of the grading, drainage, and 3,000 feet of runway paving before November 15, the seasonal shutdown date for concrete operations. The rest of the runway will be paved early this spring.

Grading and Base Course

At the start of grading, the contractor cleared and grubbed 110 acres of woods to make room for the runway. About 200 trees were cut and removed with the help of chain saws, Homelite and Disston. The 442,000 cubic yards of unclassified excavation balanced out the cuts and fills over the fairly flat site, and no borrow material was required. Marsh, peat, and muck excavation out of swampy areas totaling 15,300 cubic yards was handled by a Northwest 2½-yard shovel and four end-dump Euclids. The rest of the dirt-moving was done with four Super C Tournapulls, and two LeTourneau Carryall scrapers pulled by Caterpillar D8 tractors.

A high water table at the site, only 2 to 3 feet below grade, complicated the drainage work until a Complete well point system was installed to de-water the trenches for the trunk-line sewers. Over 5 miles of reinforced-concrete pipe, from 12 to 60 inches in diameter, was laid to drain the site. Once the main lines were in the ground they helped in lowering the water table.

A durable base course, 6 inches thick, is an excellent foundation for the runway pavement, and also extends out 100 feet at each end of the runway. Over the area at the ends the base is topped with 6 inches of loam or topsoil which is fertilized and seeded. The base is a combination of stone, stone dust, and sand, put down in two 3-inch layers which are compacted to 95 per cent Proctor density. The stone, graded from 1½-inch down, came from the contractor's quarry at Lincoln, R. I., where it was mixed with the dust, and spread over the subgrade by a pair of Adams motor graders. Sand was added to each lift, and mixed in by scarifying with the teeth on the graders. The base material compacted densely under 10-ton tandem and 3-wheel Buffalo-Springfield rollers.

Batch Plant

At one end of the field a batch plant
(Continued on next page)



Here's your **SUPER Breaker!**

JOY K-89 paving breaker

For fast demolition of those extra tough-and-heavy reinforced concrete sections—for driving heavy sheet piling with a driving shoe—for all your really rugged jobs . . . the K-89 Super Heavyweight gets the work done.

A "Big Brother" to the popular line of "K" type SILVER STREAK Paving Breakers, this NEW 90 lb., K-89 really packs a wallop. Although it strikes a powerful blow to do the heavy work, a cushion of air absorbs the blow and eliminates jarring and vibration—yet the full force of the blow is delivered direct to the steel or piling. The two sturdy "U" type side rods minimize side rod breakage and allow a comparatively smooth pocket or working surface for the operator's leg.

Owners of Joy K-type Paving Breakers like the interchangeability of many parts which keeps parts stocks at a minimum . . . and like all "Silver Streak" breakers the Super Heavyweight K-89 is CADMIUM PLATED inside and out with that silver-like covering which prevents rusting, eliminates scoring of piston and cylinder, and aids lubrication. • Write today or contact your nearest Joy office or distributor for complete details about this NEW heavy-duty breaker.

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JOY DUAL VALVE
that makes
air do more work!

JOY PRODUCTS
Portable and Stationary Compressors
Rock Drills • Wagon Drills • Core Drills
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Trench Diggers • Sheeting Drivers and
other Pneumatic Tools

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was set up consisting of a Blaw-Knox three-compartment aggregate bin and a Blaw-Knox cement bin with an adjoining silo, each holding 350 barrels of cement. Two sizes of gravel for the coarse aggregate—2-inch and 1¼-inch—were delivered to the job from the contractor's own commercial processing plant. Sand came from the nearby local pit of Campanella & Cardi Construction Co. at Hillsgrove. From the aggregate stockpiles the bins were charged by a Northwest crane equipped with a 50-foot boom and an Owen 1½-yard clamshell bucket.

Air-entrained cement in bulk shipments from the North American Portland Cement Co. at Howes Cave, N. Y., was delivered in cars to a siding of the New Haven Railroad, 5 miles from the job. Covered trucks hauled it to the plant where it was dumped into a hopper, then moved along by worm gear to an enclosed elevator. At the top of the elevator the cement discharged into the bin, with the overflow filling the adjoining silo. At the bottom of this silo a hopper returned the cement to the worm gear and elevator. A Schramm compressor supplied air for agitating the cement, and kept it from clinging to the walls of the bins.

Batches were hauled by seven trucks—one holding four batches and the rest three—an average distance of 1¼ miles. They backed under the aggregate bin for their load of sand and gravel, then drove through the other bin to pick up their cement quota. Dry weights of a typical 8-bag batch were:

Cement	752 lbs.
Sand	1,600 lbs.
Gravel, 2½-inch	1,072 lbs.
Gravel, 1¼-inch	1,210 lbs.
Water	30 gals.

Concrete Spreader on Fine-Grade

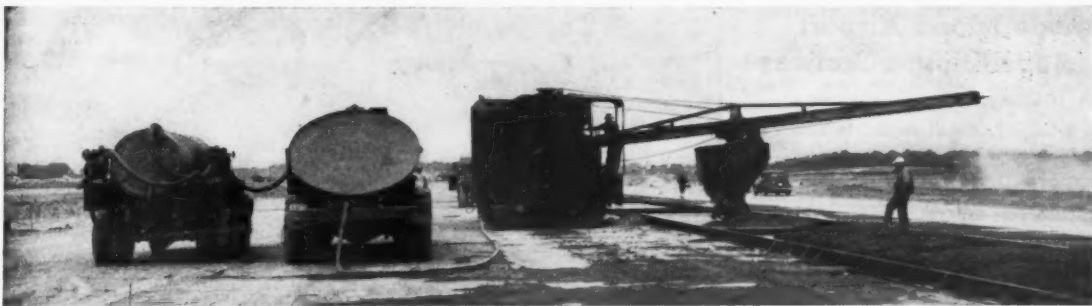
The 200-foot-wide runway is divided into 16 lanes of 12½ feet. At every fourth lane there is a ¾-inch premolded cork longitudinal expansion joint. At these joints the lanes are tied together with 1 x 16-inch dowels on 12-inch centers. The other lanes are keyed together without tie bars. Keyways are 10-foot strips of 1-inch spruce held to the steel forms by three bolts. The contractor brought to the job 9,000 linear feet of Blaw-Knox forms which, because of the densely compacted base course, were secured with pins driven by an Ingersoll-Rand pneumatic hammer, the air furnished from a truck-mounted I-R compressor.

Final fine-grading was done inside the forms by dumping a few loads of sand over the base course, and leveling it off to an average thickness of ¼ inch. This last adjustment was effected with a Blaw-Knox paddle-type spreader, a unique use for a concrete road-building machine. The sides of the forms were then oiled, and the grade was wet down.

Since the paver worked outside the forms, joints were laid out as far ahead as was convenient. Transverse expansion joints of ¾-inch cork were set on 60-foot centers with their tops one inch below the surface of the concrete. The joint setter slipped a metal cap over the cork with its top flush with the slab. The Harris assemblies supporting the joints have 12 dowels or bars to a 12½-foot lane.

Paving and Finishing

Concrete was mixed in a Ransome 34-E dual-drum paver having a 30-foot boom for its power bucket to ride on. Water from fire hydrants at the airport was delivered to the paver in two tank trucks holding 800 and 1,000 gallons. The larger tank truck usually remained at the paver, and was refilled by the smaller unit on which was mounted a Jaeger 2-inch pump for the transfer. A pump on the paver drew the water from the tank truck to the mixing drum. Batches were mixed one minute, then the concrete was discharged on the grade in front of another Blaw-



C. & E. M. Photo

A Ransome 34-E dual-drum paver at work on the airport runway with water tank trucks standing by.

Knox paddle-type spreader that leveled it off 3 inches below the top of the slab. On the 10-inch portion of the run-

way this initial strikeoff was 3½ inches low.

After this first pass, American weld-

ed wire fabric was laid in place, and more concrete added for the spreader (Concluded on next page)

Adams Traveloader



The only belt-type loader that stations operator up out of dust area giving full vision in all directions

● In contrast to other loaders, there are no blind spots for the operator of an Adams Traveloader—high, centrally-located control station, above dust area, provides unobstructed vision, whether working or traveling.

Other Traveloader advantages that contribute to fast, accurate, low-cost loading operations include: **HIGH-SPEED REVOLVING FEEDER**... Delivers a continuous stream of dirt, sod, waste scarified material, snow, etc.—at a faster rate than other machines, for greater

over-all production • **HEAVY-DUTY, INDUSTRIAL-TYPE ENGINE**... Built for long, dependable, low-cost performance • **RUGGED CONSTRUCTION THROUGHOUT**... Designed for long life—quick, easy servicing.

You'll find the new Traveloader a perfect companion machine for Adams Motor Graders for picking up all kinds of windrowed material. Before buying any loader, see your local Adams dealer—or write factory direct for illustrated catalog.



CLIP AND MAIL COUPON TODAY

J. D. Adams Manufacturing Co.
215 South Belmont Avenue
Indianapolis, Indiana

Please send me illustrated, descriptive catalog on the new Adams Traveloader.

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Title.....

Official Connection.....

Street or R.R.....

City & State.....

CEM

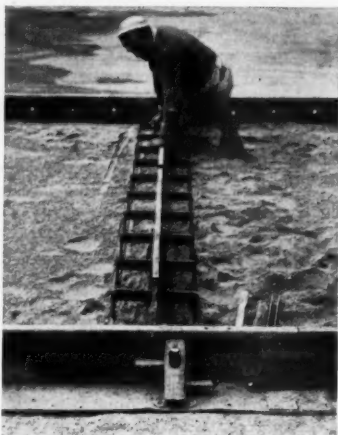


Rhode Island Airport Adds Another Runway

(Continued from preceding page)

to level off to full depth. Behind the spreader was a Blaw-Knox dual-screed finishing machine from the rear of which steel strips were pushed into the concrete to form transverse dummy contraction joints at 15-foot intervals. These strips are 2 inches deep by $\frac{3}{8}$ inch wide at the top and $\frac{1}{4}$ inch wide at the bottom. The finishers pulled these strips before the concrete hardened, and edged the dummy joints, along with the other joints, with a $\frac{1}{4}$ -inch-radius tool.

Following the machine the surface of the concrete was hand-luted and checked for irregularities with a straightedge, then given a fine hair-broom finish. Curing was done with Sisalkraft paper that was left in place for 4 days. Later the joints were cleaned out and filled with Sealz rubber compound.



C. & E. M. Photo

With the Harris expansion-joint assembly in place on the runway lane, a workman puts on the metal cap.

Paving started with a lane adjoining the center line from which the slabs pitch on a 1 per cent grade both ways to the edges. After doing a stretch of 3,000 linear feet, the contractor skipped over a 12½-foot gap, set two lines of forms and paved another lane. After that second lane was completed, only one line of forms was laid out for each succeeding lane, as the paving was done up against a previously poured slab. Rubber flanges were put on the wheels of the finishing machines that rode on the edges of the new concrete.

Paving got under way the last week in September, and continued at an average rate of 1,800 linear feet of 12½-foot lane per 9-hour working day until the suspension of operations for the season.

Quantities and Personnel

The major items in the runway contract include the following:

Unclassified excavation	442,000 cu. yds.
Loam or topsoil excavation	120,000 cu. yds.
Marsh, peat, and/or muck excavation	15,300 cu. yds.
Base course	43,400 tons
Reinforced-concrete pavement	29,670 cu. yds.
Underdrain, 6-inch	3,000 lin. ft.
Reinforced-concrete pipe, 12 to 60-inch	28,210 lin. ft.

The M. A. Gammino Construction Co. employed an average force of 75 men on the contract under the supervision of T. H. Faraone, Superintendent.

For the State of Rhode Island and Providence Plantations, Department of Public Works, Walter E. French is Resident Engineer. Philip S. Mancini is Director, George H. Henderson is Principal Engineer, and Lee V. Spencer is Construction Engineer.

The airport is in Region 1, District 2, of the CAA of which Reginald L. Reed is District Airport Engineer with headquarters at Boston, Mass.

Mixing and Paving Unit

A 12-page catalog on the Moto-Paver, a unit designed to do the complete mixing and paving job on cold-mix bituminous construction, is available from Hetherington & Berner Inc., 701-45 Kentucky Ave., Indianapolis 7, Ind. It points out that with this unit the material is proportioned and mixed in the machine, and the quality and uniformity of the mix is not dependent on the speed of travel or the uniformity of the windrow. Paving width on this unit is adjustable from 8 feet 6 inches to 12 feet, and thickness up to a maximum of 7 inches.

The Moto-Paver may be operated using sand, gravel, stone, or slag aggregates, and with most types of emul-

sion, cutbacks, road oils, and tar. On-the-job photographs show it on both resurfacing and new construction. Complete specifications are given for the standard and the heavy-duty models. The latter, the catalog points out, differs from the standard model only in the more powerful mixing engine, the larger belt-fed truck hopper, and improved bitumen control. Special features of these units and important control assemblies are illustrated and detailed in the booklet.

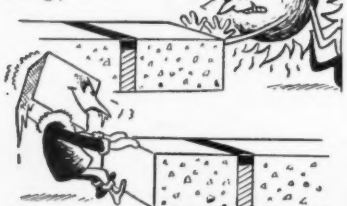
This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 747.

Manages Building Products

Alexander Rubin has been made General Manager of the Building Products Division of L. Sonneborn Sons, Inc., New York City. He has occupied an executive position with the company for the past three years; prior to that he was Branch Manager in charge of the Baltimore territory.

Where weather extremes meet...

HEAT expands pavements... closing joints.



COLD contracts pavements... opening joints.

Flintseal*
is the
BIG NAME IN JOINT-SEALING!

Mile after mile of Flintseal highway joints prove that this rubber asphalt thermoplastic joint-sealing compound has well earned its great reputation!

Engineers and contractors now know that concrete pavements, joint-sealed with Flintseal, last years longer than when ordinary materials are used.

Flintseal adheres tenaciously, does not lose bond at low temperature or flow in hot weather... remains extensible and compressible through complete cycles of expansion and contraction of the concrete.

**Specify Flintseal Hot-poured
Joint-sealing Compound**
(Fed. Spec. SS-F-336a)

You will obtain more trouble-free mileage of concrete pavements by specifying Flintseal... the big name in joint sealing.

**Write for Free, illustrated,
descriptive Booklet**

Complete technical data and specification procedures are available also upon request.

THE FLINTKOTE COMPANY
Industrial Products Division
30 Rockefeller Plaza
New York 20, N. Y.



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Products for Industry

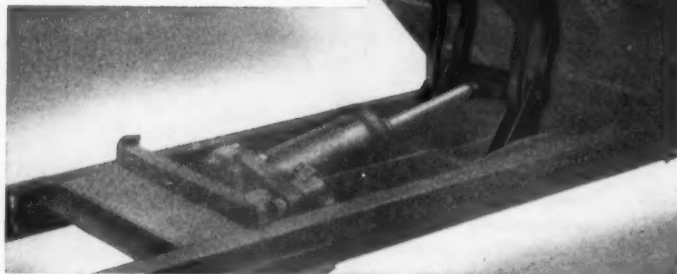
*Reg. U.S. Pat. Off.

MARION HOISTS

DO IT EASIER!

... that's why they are more

- EFFICIENT
- DEPENDABLE
- ECONOMICAL



● By use of a curved track in the patented lifting arms, MARION gives you a hoist that operates at a uniform oil pressure throughout its dumping cycle.

Some conventional hoists require a peak oil pressure of 1100 lbs. per sq. in. to do the same job that a comparable MARION hoist, with patented lifting arms, does at only 615 lbs. per sq. in.

Consequently, MARION Hoists actually do their job easier—hydraulic systems last longer, are more efficient and dependable, and, in the long run, more economical to own and operate.

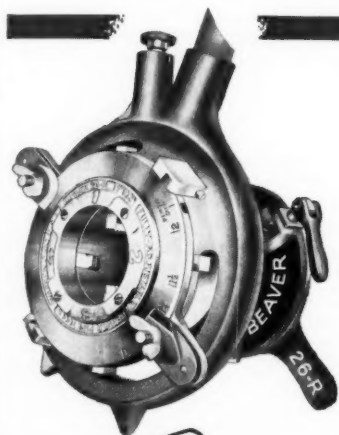
Ask us for the name of your nearest MARION Distributor—
let him give you the complete story.

MARION
BODIES AND HOISTS

MARION METAL
PRODUCTS COMPANY
MARION, OHIO, U.S.A.

STANDARD AND SPECIAL HOISTS AND DUMP BODIES FOR LIGHT, MEDIUM AND HEAVY DUTY SERVICE

BEAVER 26-R



**the only tool
of its kind that...**

...cuts either standard "taper" or electric "straight" conduit threads by a simple adjustment.

...has "radio" dial size-setting. Dies can be removed in a few seconds FROM THE OUTSIDE without use of tools.

...is fully-adjustable and easy-working. The only 1 to 2-inch pipe threader that cuts standard, oversize and undersize threads of uniform standard length.

The Beaver 26-R uses one set of dies to thread four sizes—1, 1¼, 1½ and 2-inch. It is fully-adjustable for oversize or undersize threads to compensate for variation in fittings. There's a cam-type universal self-centering chuck, too, which centers the pipe accurately and insures straight pipe lines. Yet, "drip threads" may be cut when desired for heating lines.

Available at all leading supply houses—don't accept substitutes. Competitive in price!

SEND FOR BEAVER CATALOG NO. 51
Address Beaver Pipe Tools, Inc., 258-300 Dana
Avenue, Warren, Ohio, U. S. A.

BEAVER
PIPE TOOLS

258-300 DANA AVE. • WARREN, OHIO, U. S. A.

Barrier of Concrete Tetrahedrons Closes Cofferd at McNary

Last year, McNary Dam Contractors used a barrier of 12-ton concrete tetrahedrons to close the second-stage cofferdam at McNary Dam near Umatilla, Ore. The purpose of the closure was to divert the Columbia River toward the Washington side of the dam, through the completed bays of the spillway and the 675-foot long single-lift lock. It was the first time an attempt had been made to divert a stream of Columbia's volume by that method.

Over 430 of the massive tetrahedrons had been skidded into the 240-foot gap in the upper wing of the coffer, and 2,300 tons of "B" rock had been dumped in just upstream of them, when the closure came to a halt temporarily. The river was undercutting one of the steel sheet-pile cells near the Washington side.

There was a sort of secondary, shallower channel on that side, with a low-water island between it and the deep Oregon-side channel. The contractor had felt he could close the gap on the Oregon side and at the same time go right on driving and ballasting the last of the sheet-pile cells on the Washington side. But after the first drop of tetrahedrons and "B" rock, the water humped up about 5 feet at the gap; this was when the undercutting occurred. The contractor halted closure operations and finished up the cell work October 30. Then he resumed closure work.

By last November the barrier of "tets" and "B" rock had been brought up to the surface. It was continued to elevation 270 and leveled off, then a temporary road for job vehicles was stretched along the top of it. A cribbing will top this; the downstream side will be filled in with a balance of 700 tets, and the upstream face with fines and impervious material.

By the beginning of this year, the lower wing of the main cofferdam was practically complete, the 43-acre site for 12 units of the 14-unit powerhouse had been enclosed, and the unwatering of the area was started on January 19. It was completed by January 25. In addition to the powerhouse units, 8½ spillway bays will go in the enclosed area, to be lined up with the 13½ bays already completed at the Washington side.

Total cost of the closure of the 240-foot gap was about \$980,000. Tetrahedrons came to \$600,000 all placed. "B" and "C" rock came to \$200,000. Enough steel will go into McNary to build about three battleships the size of the Missouri, and enough concrete to stretch in a cubic-yard line about two-thirds the length of the Great Wall of China. When completed, multiple-purpose McNary will furnish 980,000 kilowatts of electric energy, the first of which will come off the first two units in December, 1953.

Hercules Moves in Frisco

The San Francisco office of Hercules Powder Co. has been moved from Montgomery St. to the Standard Oil Bldg., 225 Bush St. The office handles sales of Hercules products in the Bay area.

Vulcan Tools

A complete line for every type of Rock Drill, Pavement Breaker and Clay Digger.

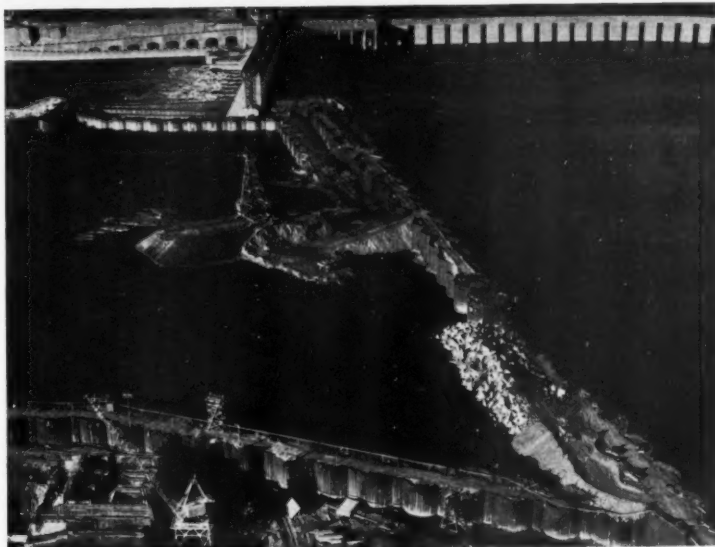
Vulcan Tool Manufacturing Co.

35-43 Liberty Street, Quincy, Mass.

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74 Murray St.
New York, N. Y.

34 No. Clinton St.
Chicago, Ill.



This is McNary Dam from the Oregon side looking toward the Washington side.

Corrugated-Metal Pipe

A new 16-page booklet entitled "Armco Corrugated-Metal Pipe—A Type for Every Need" has been prepared by Armco Drainage & Metal Products, Inc., Middletown, Ohio. It lists the types of full-round pipe and Pipe-Arch available for various types of sewers, culverts, conduits, or irrigation systems. It also contains reference data for selecting the most suitable structure. Prefabricated Armco corrugated-metal structures in diameters up to 96 inches are described.

Photographs and case histories show conditions under which plain-galvanized, asphalt-coated, asbestos-bonded, and paved-invert pipe and Pipe-Arch have been used. Tables indicate size, gage, weight, and end area for each type. Also included are details on fittings and instructions on the installation of Armco drainage structures.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 830.

PILE-DRIVING or EXTRACTING

Do It the Modern Way—With a Cleaver-Brooks Self-Contained, Mobile Steam Boiler . . .

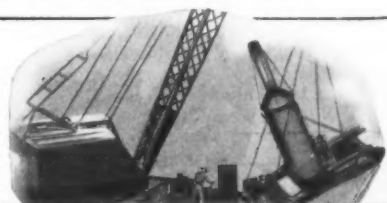
Get to Location Fast—

Cleaver-Brooks self-contained mobile steam boilers are easily towed from job site to job site—quickly moved from one location to another on the same job. They're built with all-weather protection—carry their own fuel tanks—burn light fuel oil.



Get Going Fast—When the job foreman taps his cap—the signal to start driving—the steam is there with a Cleaver-Brooks—hot, dry steam that means smooth, powerful hammer action—plenty of it to enable operators to drive more piles in less time—cut man-hours on every job. With constant steam pressure, through automatic flame control on the Cleaver-Brooks boiler, engineers can accurately check load bearings.

The Old Way Is Out—You don't need a crane to set up a Cleaver-Brooks. Oil-fired and rapidly starting—there's no need to keep and bank fires at night for an early start in the morning. Variations in hammer sizes or steam requirements present no problem with a Cleaver-Brooks boiler—it operates at 80% efficiency from full load down to 30% of rating. Fast steaming—clean, smokeless operation.



A Modern High Efficiency Mobile or Portable Boiler

Available as trailer or skid mounted units. Heavy duty built. 80-125 BHP. Capacity—lbs. of steam per hour (212° F.) 2760-4300. Constant steam pressure through automatic low and high fire control. All-year, all-season usefulness—besides pile-driving and extracting, use it for asphalt plant, ready-mix concrete plant, winter concrete operations, thawing or miscellaneous heating. Send for bulletin.

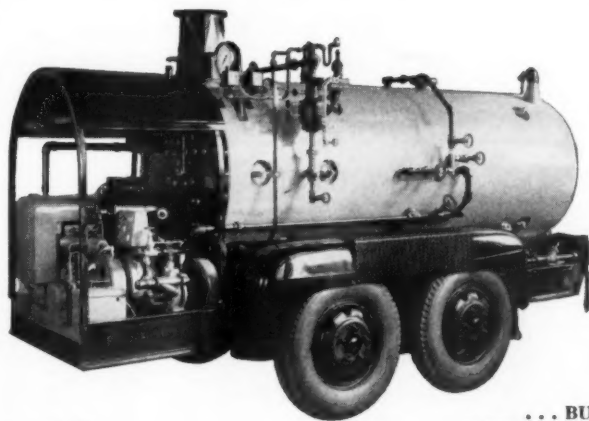
CLEAVER-BROOKS COMPANY
390 E. Keefe Ave. Milwaukee 12, Wis.

... BUILT WITH THE FAMED
FOUR-PASS HIGH EFFICIENCY DESIGN OF

Cleaver-Brooks
STEAM BOILERS



Send for the bulletin "Modern Pile-Driving and Extracting with Cleaver-Brooks Mobile Steam Boilers"—for complete information.



Hydraulic Filter Cleans Dirty Liquid

A new hydraulic filter, announced by Dollinger Corp., 11 Centre Park, Rochester 3, N. Y., is designed for use wherever dirty liquids are collected and recirculated. It is suited for application on hydraulic presses, conveyors, lathes, shapers, planers, drills, and other types of cutting tools and hydraulically operated machines.

Savings with the Staynew filters are effected in three ways, the company says. First, unnecessary wear on pumps and other equipment is prevented by eliminating the intake of abrasive particles. Second, man-hours are saved by eliminating idle time while worn machines are replaced or repaired. Third, spoilage and rejects at the point of use are kept to a minimum by providing clean, clear liquid.

There are three major parts to the filter: lower end plate, insert, and combined supporting tube and upper end plate with threaded outlet sleeve. The unit may be disassembled in 30 seconds, and the insert replaced or cleaned with solvent or brush. These new filters are available in eight different models with capacities ranging up to 72 gpm.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 737.

Sectional Scaffolds Serve for Many Jobs

The new 12-page Bulletin PSS-24 issued by The Patent Scaffolding Co., Inc., 38-21 Twelfth St., Long Island City 1, N. Y., stresses pictorially the convenience and economy of Trouble Saver sectional tubular steel scaffolding for many general construction uses.

Forty-eight photographs and line drawings give detailed information on erecting and dismantling basic units, and on building up complete assemblies. They show available frames and components, and a variety of on-the-job applications ranging from rolling scaffolds and other small assemblies to large and elaborate erections covering entire buildings. Trouble Saver sectional scaffolds, it is pointed out, may be assembled, without tools, from welded prefabricated parts.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 739.

Portable Electric Drills

A 36-page booklet on portable electric drills, their care, and how and where to use them has been prepared by Mall Tool Co., 7743 S. Chicago Ave., Chicago 19, Ill.

Several sections are devoted to a step-by-step explanation of technical operations such as drilling pilot holes, drilling concentrically in a scribed circle, and the proper drilling of various materials. Handy tables and charts give reference to the drill sizes and speeds required for specific jobs.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 803.

Welding-Alloys Chart

A new reference guide containing complete specifications on close to 100 different Eutectic Low Temperature Welding Alloys used in welding, brazing, and hard-surfacing of steel, alloy steels, stainless steel, cast iron, brass, bronze, copper, aluminum, magnesium, zinc die cast, etc., is now available from Eutectic Welding Alloys Corp., 40 Worth St., New York 13, N. Y.

Detailed information is given in this 6-page folder on alloys and electrodes, covering their composition; heating facilities which can be used; metals on which to use; type and preparation of joint; preheating of parent metal;

color-match rating with metals for which listed; approximate heat and corrosion ratings, etc.

This literature may be obtained from the company by requesting Chart TIS 246 P, or by using the Request Card at page 16. Circle No. 701.

New 1 1/4-Yard Loader

A new 1 1/4-cubic-yard Payloader tractor-shovel, available with 60-hp gasoline or diesel power, has been developed by The Frank G. Hough Co., 822 Seventh St., Libertyville, Ill. The engine on the new Model HY is at the rear, set over the drive wheels for maximum tractive effort and capacity.



Bucket capacity of Hough's new Model HY Payloader is 1 1/4 cubic yards. It is available with gasoline or diesel power.

The seat for the operator is forward to give him a clear view of the working area.

The Model HY features bucket crowd

and automatic bucket tip-back to prevent spillage—both standard features in the Payloader line. It also offers hydraulic power control of bucket dump and bucket close. A full-reversing transmission gives four speeds in each direction, up to 29 mph, and an independent quick-acting reverse control. Effortless steering is obtained by power boosting, Hough reports. Digging angle or bucket pitch is adjustable between 1 and 6 degrees. The maximum dumping clearance on the new 1 1/4-yard model is over 8 feet, enabling it to heap-load big trucks.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 740.



Maintains Roads and Streets



Loads From Stockpiles



Scarifies Top Surface

only the ALLIS-CHALMERS model



WEIGHT — 11,000 lbs. (bare)
BRAKE HP. — 60 (Allis-Chalmers engine)
SPEEDS — forward, to 18.6 mph.; reverse, 12.5 mph.

More than a highly efficient, low-cost motor grader with big grader features... the "D" is a year, many-job machine... the most useful grader on the market today with easily mounted attachments:

REAR-END LOADER 5/8-cu. yd. bucket, hydraulically operated... tandem drive traction.

V OR BLADE-TYPE SNOWPLOWS Interchangeable, hydraulically operated. Blade plow may also be used for backfilling and light dozing.

SCARIFIER Mounts behind grader... makes full use of weight and traction. Working is positive, easier.

WINDROW ELIMINATOR Hydraulic controlled, saves extra passes by feathering windrow left by grader blade.

Let your Allis-Chalmers dealer show you what the Model D can do for you

ALLIS-CHALMERS
TRACTOR DIVISION • MILWAUKEE 1, WIS.
FOR GREATER PRODUCTION... FOR EASIER OPERATION... FOR SIMPLIFIED MAINTENANCE

Engine Oil Pressure

The March issue of *Lubrication*, a technical publication prepared by The Texas Co., 135 E. 42nd St., New York 17, N. Y., contains a 15-page study of engine oil pressure. The article points out that the lubrication system of an engine is not unlike the blood system of the human body, and both should be checked regularly. It explains that oil pressure may be a very useful indicator of engine functioning. The purpose of the article is to accumulate information on engine oil pressure, to understand why it varies and what variations mean; also, to review some details that have a bearing on lubrication-system design.

tem design.

Copies of the report "Engine Oil Pressure" may be obtained by requesting the March, 1951, copy of *Lubrication* from The Texas Co., or by using the Request Card at page 16. Circle No. 761.

Jeep-Mounted Auger Drill

Literature on the recently developed Jeep-mounted Mobile Drill for prospecting for aggregates, shooting overburden, testing soil, drilling blast holes, etc., is available from Mobile Drilling, Inc., 960 N. Pennsylvania St., Indianapolis 4, Ind.

The Mobile Drill mounts on the back

of a Jeep, tractor, or truck and may be powered by the standard takeoff. It has an adaptor for quick conversion from vertical to horizontal drilling. The standard Model B-27 emphasized in the bulletin has a drill range from 1½ to 6-inch diameters and a depth range to 100 feet. Other models, designed to use augers up to 36 inches, are also available.

Features of the Mobile Drill include easy dismounting from the transporting vehicle, hydraulic control of speed and power of hole penetration, accessibility for drilling in all materials, and dry or wet hole drilling. Its mobility and versatility under varied field conditions are highlighted in the catalog. Complete specifications and price lists for all models of the Mobile Drill are available.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 727.

St. Louis Steel Plant Grows

To take care of a rising demand for defense-work steel, Joseph T. Ryerson & Son, Inc., steel distributor, will reconstruct its St. Louis plant and add more warehouse space. Total warehouse and office space of the enlarged plant will be about 161,000 square feet. The project will be completed before the end of this year.



Slopes Banks — up to 2:1



Cuts and Cleans Ditches



Strips Sod

*can handle
so great a variety of jobs
— at a new low cost*



Finishes Between Forms



Grades Shoulders



Feathers Out Windrows



Levels Subdivisions



Works and Spreads Oil Mix



Loads Surplus Dirt



Handles Terracing



Plows Snow



Loads Snow

Lab Goes to Work On Road-Base Costs

Technicians Predict, Field Men Prove, That Native Base Materials, Once Thought Poor, Will Blend Well

• NATIVE material usually makes the most economical base a road builder can use. That thought has been a fundamental in road building for 40 years. Yet there are countless examples today where it has been ignored. Why?

Wherever thinking highway engineers gather to discuss the situation today, this matter of base material and economics is coming up more and more. Some engineers say native materials are exhausted; there aren't any more.

A few—and they are becoming numerous—say native base materials

aren't exhausted. They say that the materials are there, all right, either in pure form or in several deposits which would blend together and make a fine subbase, particularly on secondary roads now so important on the agenda. They say the laboratories aren't being used as much as they should be.

The Texas Highway Department agrees with the latter thought. When practical men with years of empirical knowledge turn to the highways laboratory to do an even better job, interesting things can be expected to happen. They are happening now.

One District Engineer put it this way: "Most any good engineer can build 50 jobs out of 100 that will give the service they were designed for. We want to build 99 good ones out of 100. That takes more than guesswork!"

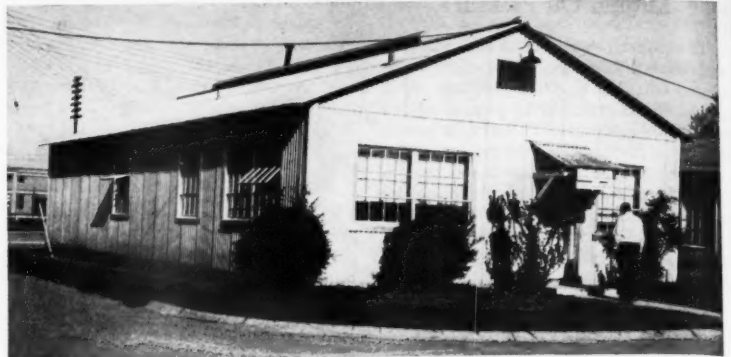
His district, like a number of others in the state of Texas, has recently tested in the laboratory and then proved in the field that many low-cost types of base materials are available although they have never been used—native materials that lie on top of the ground waiting to be picked up, but which road builders have passed by in favor of other materials.

Maybe it could be called a necessity but more probably should be called progress—in either case, a lot of satisfactory bases are being constructed by blending two or more native materials.

Here's One Example

Several years ago a set of plans came in for a farm-to-market highway. The maximum allowable cost for reconstruction was \$4,000 a mile. Judged by any standard previously used in Texas road building in that area, the job was impossible. You couldn't even haul the base for that figure.

By "base material" they were thinking in terms of the red granite-gravel that had been used for 30 years, and even shipped as far east as Fort Worth



C. & E. M. Photo

District 14 in Texas has its own laboratory for the routine analysis of field materials. It is a corrugated-asbestos building 30 x 60 feet.

and Tyler. Granite-gravel is a small-sized reddish material, with plenty of high-PI clay between particles that are mostly $\frac{3}{8}$ to $\frac{1}{2}$ inch in size.

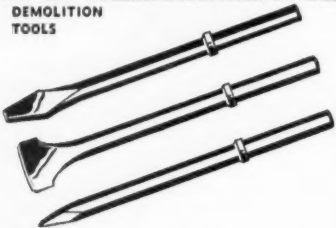
During the early days of practical

road building, that material was considered the *ne plus ultra*, or something like it. When some of the roads on which it was used began to fail, lab

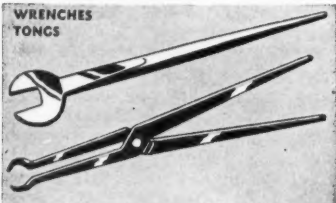
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STRUCTO LINE OF CONTRACTORS TOOLS

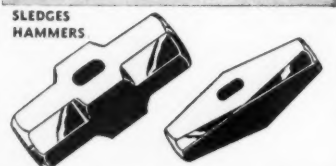
DEMOLITION TOOLS



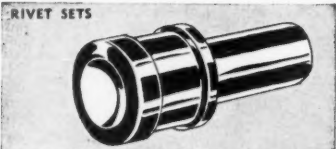
WRENCHES TONGS



SLEDGES HAMMERS



RIVET SETS



DRIFT PINS



AIR HAMMER TOOLS



ALL STRUCTO tools are made in the Arrow shops by skilled tool makers.

Only the finest quality steel is used, and every STRUCTO tool is backed by 36 years experience in making fine tools.

Write for Bulletin No. 75 showing the complete line.

ARROW TOOLS INC.

1900 South Kostner Ave., Chicago 23, Ill.

Compressed Air to handle **For Less!** most jobs

smith
MODEL 105-P
AIR COMPRESSOR

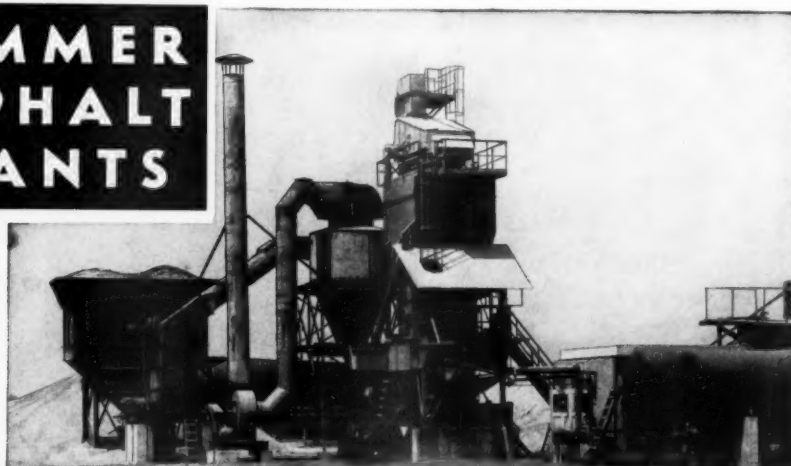
Model 105-P. Has self-starter, battery ignition, voltage regulator, large radiator capacity with thermostat for quick warmup.

The Smith 105-P delivers smooth power, gives long performance, and will handle most of your compressor work, for less! Powered with Chrysler Ind. 15 Industrial Engine with 377 cu. in. displacement. Delivers 105 cu. ft. per minute. Has sodium cooled valves and Stellite valve seats in engine. Stainless steel disc type valves and Manganese Bronze seats in compressor. Heavy duty with light weight (2100 lbs.). Write for literature and prices.

Also the SMITH 70-P AIR COMPRESSOR

GORDON SMITH & CO. 483 COLLEGE STREET
BOWLING GREEN, KY.

CUMMER ASPHALT PLANTS



90 TO 100
TONS
PER HOUR

For Continuous, High, Efficient Production

You can always count on Cumer Asphalt Plants for continuous, high and efficient production. The one illustrated has a capacity of 90 to 100 tons per hour . . . internal combustion with low pressure burner equipment . . . feeder bin and feeder equipment . . . dust collector discharging reclaimed dust into hot elevator . . . vibrating screen . . . large four compartment hot storage bin. Sizes from 50 to 100 tons per hour (complete drying and mixing units) are available. PROMPT SHIPMENT OF ALL SIZES. Also feeders, storage bins, pumps and timers. Catalog sent on request.

THE F. D. CUMMER & SON COMPANY

Builder of Fine Asphalt Plants

CLEVELAND 15, OHIO, U.S.A.

technicians checked up. They found a PI above the danger point.

But even this material was too costly for this job. The nearest pit was several miles away. Hauling costs would eat up the \$4,000 per mile before the stuff was spread or surfaced.

The project skirted a river at so many points that it even seemed that Mother Nature was mocking the engineers. Great bars of the uniform-sized granite gravel, the particles washed clear of the usual clay binder, lay exposed at many points along the road. The river had washed the rock as clean as concrete aggregate. It had been there for years but road builders had ignored it. Bases had to be sticky. They had to have cohesion.

What would happen, one engineer wondered, if he took this clean gravel and mixed it with something that had cohesion and other fines? After all, hadn't Mother Nature washed and delivered this material to the job?

Samples were taken. Men studied the locality to discover the missing elements of a theoretically good base course. In a nearby stream bank they found a large deposit of sandy clay. Like the gravel, it in itself was unsuitable as a base. They mixed the two together. The result was beyond expectation. Maybe it wouldn't do for a primary highway, but it would do here better than the traditional material.

Skip loaders, draglines, and trucks moved in to dig and haul. Motor graders bladed it together. Laboratory technicians, busy as ants, ran sample after sample to see that the blending was uniform. Then the base was laid and rolled. In time an asphalt surface went down. It held.

The field had proved what the laboratory had predicted: that a potentially valuable combination of base materials had been ignored for years. Final costs were below the \$4,000 maximum per mile. In fact, the engineers were a little embarrassed. Maybe headquarters might believe it could always be done for that!

Geology Not Unusual

Now the geological layout of this area is varied, but perhaps no different from many a highway district in the nation. The district includes 11 counties in central Texas.

Going northeast from Austin, the state capital, the geologist soon finds Austin chalk. It is a whitish formation, vulnerable to slaking action when the air can hit it. Road builders formerly believed it was a good base material, but laboratory tests have shown that its slaking action increased the fines beyond the failure point.

Still farther east there is Eagle Ford

shale and Taylor marl, a black waxy soil characteristic of that agricultural part of the district. Limited amounts of iron ore show up too, and there are a few sandstone outcrops in the eastern part of the district.

In the western part of the district there are large exposures of Edwards and other limestones. They are stable. They wear well and are generally satisfactory for base construction. And yet it is often difficult to tell, without a laboratory check, what the difference is between these limestones and Austin chalk.

Farther west are deposits of caliche, with variable amounts of clay. The northwest corner is a large igneous area, composed of vari-hued granites and mica schists, impregnated with clay.

The Balcones fault cuts the district almost exactly in half between the two general types of materials.

Generally speaking, this district has road-building problems like many more throughout the nation. There are a few

excellent materials but the deposits are running out. There are many poor materials. There are some materials which, up until a few years ago, had not been considered too seriously by themselves. The laboratory is now proving that some of these materials will mix to good advantage. This process is called "mechanical stabilization", and especially on secondary roads where limited funds haunt the designers, it is being used wherever possible. Base-course stabilization of this nature, with the addition of small amounts of hydrated lime, comes next. Stabilization with asphalt or portland cement is done only when there is no possibility of using mechanical or mechanical-lime treatment.

Various Combinations

A number of mechanical-stabilization combinations are being used and the laboratory is constantly at work to develop more. The basic material in this type of stabilization is one of the several deposits previously described. Typical test results of the pit-run materials used are shown in the table below.

Gravels, caliche, and iron ore often are suitable for bases by themselves, and can be used without admixtures. The many possible combinations of these materials are shown by the ways they have been mixed.

In the case of No. 1, limestone gravel, blow-sand binder such as No. 7 is added to reduce the dangerous PI.

(Continued on next page)

No.	Local Name	2-inch	1-inch	1/2-inch	No. 4	10	20	40	LL	PI	LS
1.	Limestone gravel	0	3	23	49	70	79	81	37	22	11.4
2.	Granite gravel	..	..	2	17	..	..	78	40	21	8.9
3.	Flint gravel	14	..	28	32	..	..	73	17	4	1.5
4.	Iron-ore gravel	..	..	11	18	..	..	66	40	22	11.8
5.	River gravel (Limestone)	..	..	27	43	..	..	76	21	5	2.3
6.	River gravel (Granite)	..	..	35	41	..	..	90	19	2	1.6
7.	Blow-sand binder	0	17	3	1.8
8.	Sand-clay binder	0	26	9	3.0
9.	Caliche binder	5	15	29	31	13	6.1

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These new 1951 Chevrolet trucks are tops in value. They're tough and rugged. They're loaded to the brim with power. They're thrifty... move massive loads... handle like no other truck. Chevrolet's latest haulers have 51's finest new features, too. Features like new, super-effective brakes that are extra-safe and easy to operate. Features like Chevrolet's Dual-Shoe parking brake, Chevrolet's new Ventipanes and new cab seats that bring you comfort with a capital "C." Visit your Chevrolet dealer and look over these great new trucks. You'll find the right truck for *your* job!

CHEVROLET MOTOR DIVISION, General Motors Corporation
DETROIT 2, MICHIGAN



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TWO GREAT VALVE-IN-HEAD ENGINES—the 105-h.p. Loadmaster or the 92-h.p. Thriftmaster—to give you greater power per gallon, lower cost per load • **POWER-JET CARBURETOR**—for smooth, quick acceleration response • **DIAPHRAGM SPRING CLUTCH**—for easy-action engagement • **SYNCHROMESH TRANSMISSIONS**—for fast, smooth

shifting • **HYPOID REAR AXLES**—for dependability and long life • **NEW TORQUE-ACTION BRAKES**—for light-duty models • **PROVED DEPENDABLE DOUBLE-ARTICULATED BRAKES**—for medium-duty models • **NEW TWIN-ACTION REAR BRAKES**—for heavy-duty models • **NEW DUAL-SHOE PARKING BRAKE**—for greater holding ability on heavy-duty

models • **NEW CAB SEATS**—for complete riding comfort • **NEW VENTIPANES**—for improved cab ventilation • **WIDE-BASE WHEELS**—for increased tire mileage • **BALL-TYPE STEERING**—for easier handling • **UNIT-DESIGN BODIES**—for greater load protection • **ADVANCE-DESIGN STYLING**—for increased comfort and modern appearance.

DIG HOLES SITTING DOWN



ONE-MAN OPERATION

The Danuser Digger is easily installed on most popular makes of tractors—augers from 4" to 24" available in eight sizes. Quality built—rugged construction throughout. Literature showing application to your particular tractor available, write

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537-41 E. THIRD ST., FULTON, MO.

DANUSER DIGGER

Tested and approved by most tractor manufacturers.



Lab Goes to Work On Road-Base Costs

(Continued from preceding page)

No. 3, flint gravel, has little binder and cohesion. When sand-clay binder such as No. 8 is added to introduce these missing elements, the material makes an excellent base.

No. 4, iron-ore gravel, was tricky. It required the addition of river gravel such as No. 5 to reduce the percentage of soil binder, and lime was added to reduce the PI.

No. 5, limestone river gravel, responded well when caliche binder such as No. 9 was added to increase the amount of binder and cohesion.

No. 6, granite river gravel, made a good base when No. 8 sand-clay binder was added to increase the cohesion between particles.

Since the materials mentioned were usually existing in an old base or were required as base in new construction, they required mixing only. Men who put in this work made a careful study and say that each 50 cubic yards of material required one hour of blading. At \$5.00 per hour this amounted to 10 cents per cubic yard, loose measurement. For a base of 6-inch compacted thickness and 34 feet wide this amounted to a little over 7 cents per square yard or \$450.00 per mile.

Extensive Lab Facilities

District 14 headquarters, inside the old Camp Hubbard grounds, are situated close by the Texas state laboratory. Despite this proximity, the District has its own building and laboratory staff for the routine analysis of field materials. This is not a duplication and no time is wasted. Complicated tests like triaxials, for example, are run in the state laboratory. There is plenty to do at district level with routine work.

The laboratory structure is a corrugated-asbestos building 30 x 60 feet. In it are no rusty wheelbarrows, coils of rope, spare storehouse space, snatch blocks, dust, cobwebs, and usual "laboratory equipment" seen all too often in various parts of the U. S. In this laboratory there is neatness, order, busy people, and laboratory equipment.

They have two analytical balancers, and the necessary dishes, trays, pans, sampling tubes, and so on. There is a press for punch and shear tests, a Carver press, and a pulverizer for reducing soaked or cooked samples back to their original fine state. The laboratory includes modified-bearing-value equipment, a concrete-beam breaker, an asphalt extractor, and an asphalt press.

All the usual soil tests can be run, such as liquid limit, plasticity index, gradation, and the percentage of binder. Screen analyses are done by the hundreds. They have a wet ball mill, which is a rattler-type test to determine the difference between Edwards limestone and Austin chalk.



C. & E. M. Photo

C. G. Michalk, Laboratory Technician, pours an earth sample into a pulverizer.

Punch and shear tests are done on cement-stabilization jobs when this design is proposed, and a modified-bearing-ratio test has been developed to check asphalt stabilization. The laboratory does unconfined compression testing, too.

On hot-mix asphalt pavements, the laboratory does simple extractions, screen analyses, and Texas punching

tests. For portland-cement-concrete work, it does screen analyses, color tests, weights, Sg's; breaks beams; and generally checks filed results.

The main point which should be emphasized is that the laboratory has now come to be as much a part of construction and maintenance work as a motor grader or any other piece of equipment. Road builders in this district never check a gravel pit, study a highway, or do field work involving base materials without sampling the deposit and bringing the sample to the lab. Two technicians work full time running these samples. The results are being recorded in clear records, correlated constantly, and the information given to the field. There's no missing link.

Strangely enough, the many discoveries being made regarding suitable base materials are proving to be a source of interest to the field men, rather than an annoyance. A genuine group spirit has been developed, and

(Continued on next page)

Automotive Shovel With Hydraulic Crowd and Hoist Speeds Up Excavation Work

Unit Reduces Excavation Costs; Loads Up To One Cubic Yard A Minute

MOVING SHOVEL LOADERS to and from jobs is one of the most expensive unproductive costs in excavation work. Contractors lose hundreds of hours and spend thousands of dollars annually moving this equipment. Developments since the war show that contractors can be relieved greatly of these costs. One of the most successful developments has been the manufacture of the rubber-tired Dempster-Diggster shovel loader that travels at truck speeds.

Digs Through 15 Foot Bank

Construction men have found that on big jobs the Dempster-Diggster has no equal for working in tight places and for freeing big shovels for heavier work. The Diggster has an 8 foot 10 inch crowding reach, will dig through a 15 foot bank, and will dig 15 inches below grade.

Manufacturer's tests and contractor's reports show that the Diggster will load up to one cubic yard a minute. This speed in excavation is accounted for, mainly, by the Diggster's exclusive independent hydraulic crowd and hoist action, the hydraulic steering, and wheel-type traction.

The power crowd permits bucket to keep digging until loaded . . . no digging with wheels. The hydraulic steering gives the driver sensitive, finger-tip control. When accelerated, a one-handed twist of the steering wheel puts the machine in any desired position. By operating on rubber-tired wheels, the



THE DEMPSTER-DIGGSTER is shown here digging out a 15 foot bank of hard chert. The power crowd permits bucket to keep digging until loaded . . . no digging with wheels.

Diggster, of course, can move at the fastest possible speed.

Not A Fair Weather Machine Only

Under adverse conditions on a state highway near Charleston, W. Va., recently, the Diggster loaded 150 cubic yards of sticky blue clay in only three hours. The work consisted of cleaning up slides on 14 foot embankments on both sides of a concrete road. The weather was not cooperative, inasmuch as considerable rain fell the night before. But the Diggster showed no tendency to slide. The job foreman stated that it loaded more material in two hours than the $\frac{3}{4}$ and $\frac{1}{2}$ cubic yard truck shovels normally did in an entire day. This and many other operations in inclement weather have proved that the Diggster is not a fair weather machine only.

The Dempster-Diggster has a 15 foot turning radius, is 20 feet long when bucket is in traveling position, and is nine feet and six inches in height.

Four standard interchangeable buckets of two types are available. Digging buckets with four bottom teeth in 1 and $1\frac{1}{4}$ cubic yard (heaped) capacities. Materials handling buckets in $1\frac{1}{2}$ and 2 cubic yard (struck) capacities.

Crawler Traction Available

For fast, efficient operation in difficult terrain, the Diggster is available with crawler-type traction.



Complete information and prices may be obtained by writing the manufacturer, Dempster Brothers, Inc., Knoxville, Tenn.



DEMPSTER BROTHERS

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Construction Buildings Bolted Together In a Few Hours!



The answer to needs of contractors, architects and engineers for a low cost, quickly erected and dismantled building. Proven ideal for field offices, workshops, tool sheds, storage and bunk houses. Built in unit-sections, reusable on job after job. 6-sided "base" buildings in 4 different sizes are extendable to any length. Finest West Coast Fir throughout. Write for Circular.

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ENCLOSED STEEL CAB protects operator against inclement weather.



C. & E. M. Photo

Rows of samples stacked on shelves give some idea of the scope of sampling in the Austin District. District Construction Engineer M. C. Carter looks them over.

the field men have learned that intelligent laboratory work can improve even their best performances.

Full-Time Core Drilling

Not content merely to sample developed pits, the District operates one core drill full time and often has as many as two others working. An inspector is always with the core drill. He logs the test results and does not leave it to the two drillers.

The inspector also makes the contacts with land owners whose property will be involved. The State insists on signed lease agreements before drilling anybody's land. The inspector makes these agreements, does general "leg work", and supervises the work of the core drill.

This rig is highly mobile. Mounted on an ex-Army 6 x 6 GMC truck, it can go practically any place in the area. The rig can drill 125 feet deep, but average holes are more nearly 20 feet.

The rotary drill is shop-built. Powered by a Ford engine, it makes good time even in rock. The rig has a 13½-hp Wisconsin mud-pump engine, a Gardner-Denver mud-pump, one 2-inch and one 3-inch centrifugal water pump. Water, an important commodity here, is hauled by two tank trucks.

The core-drilling rig recently discovered a deposit of high-grade sand which was badly needed near a project. There was no reason to believe it was there, either. It was in an area where sand was uncommon. But the careful exploration work which is always going on paid big dividends and saved the State a great deal of money on the project.

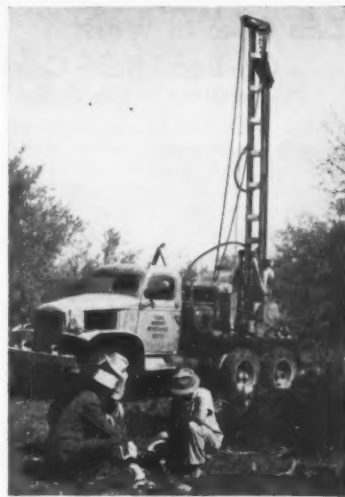
Test holes are also drilled out and dynamited, where contractors are expected to put in a crusher. The drilling and loading data are carefully assembled for the contractor's use, and the test shot, usually about 10 x 12 feet, is left open for inspection.

Lime Stabilization

To heighten the general results of mechanical stabilization, hydrated lime is often added. Perhaps more of this work has been done in District 14 than in any other district in Texas. Short experimental sections were first built during the war, using waste lime. Since the war, approximately 90 miles have been treated, usually on the basis of 3 per cent of lime by weight.

Methods of construction, followed closely by laboratory tests, have been practically the same, since all mixing has been done by blades. The gravel is normally dumped in the center of the road. The piles are evened by blading, leaving a V-trench in the center.

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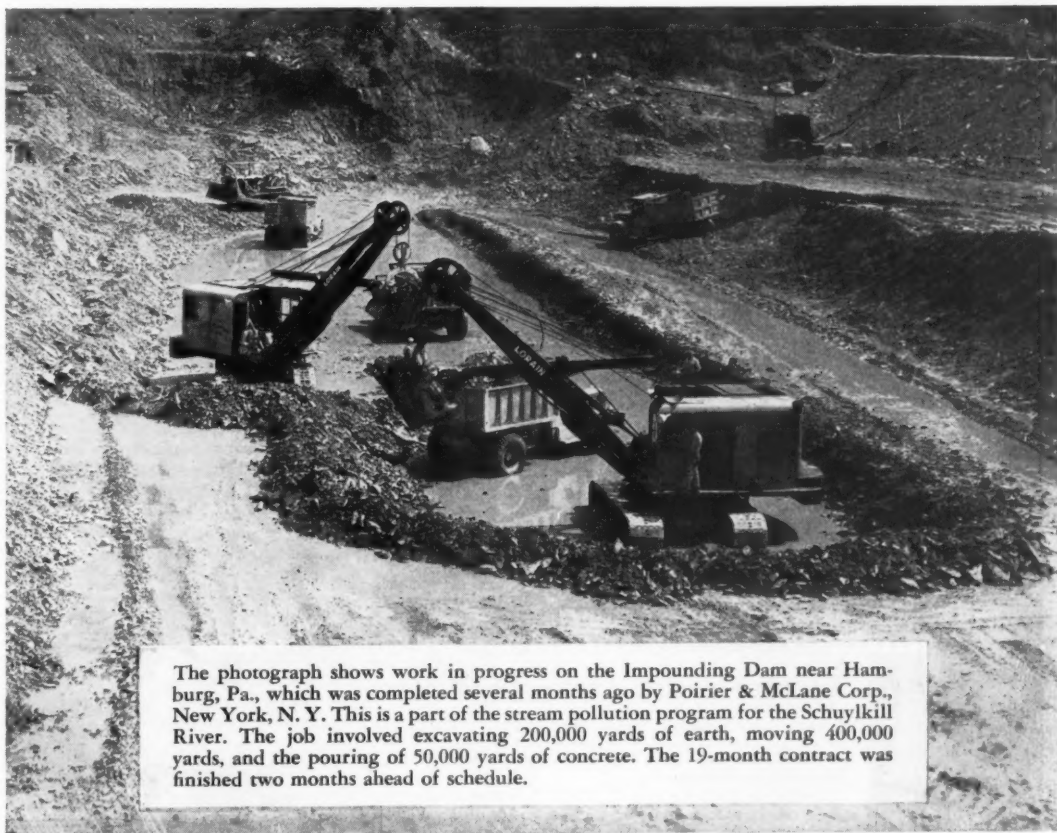


C. & E. M. Photo

Far out in the back country of District 14 a core-drilling rig samples a local formation.

GULF PRODUCTS and FINE SERVICE

*keep equipment rolling
on Impounding Dam Project*



The photograph shows work in progress on the Impounding Dam near Hamburg, Pa., which was completed several months ago by Poirier & McLane Corp., New York, N. Y. This is a part of the stream pollution program for the Schuylkill River. The job involved excavating 200,000 yards of earth, moving 400,000 yards, and the pouring of 50,000 yards of concrete. The 19-month contract was finished two months ahead of schedule.

POIRIER & McLANE CORP. is one of a number of prominent New York contractors who find that the use of Gulf quality lubricants and fuels is a big help in beating contract schedules.

There are three solid reasons why so many leading contractors select the petroleum products bearing the familiar Gulf Orange Disc. One is performance—the kind of lubricant and fuel efficiency that insures smooth, dependable operation and low maintenance cost. Another is the high type of engineering service Gulf provides to help insure that the most suitable lubricants and fuels are used for every unit and operating condition. Third, Gulf's prompt delivery service.

Write, wire or phone your nearest Gulf office today and arrange to use Gulf quality products on your next job. Gulf Oil Corporation • Gulf Refining Company, Gulf Building, Pittsburgh, Pennsylvania.



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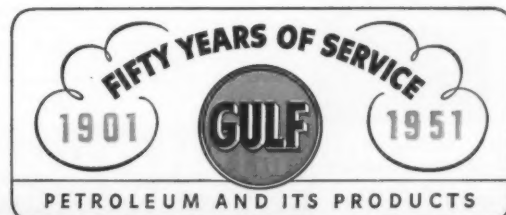
For making pipe by hand methods by either the wet or semi-dry processes. Built to give more years of service—sizes for pipe from 18" up to 120" and larger—tongue and groove or bell end pipe at lowest cost.

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Also manufacturers

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QUINN WIRE & IRON WORKS 1645-1231 BOONE IA



Lab Goes to Work On Road-Base Costs

(Continued from preceding page)

This is to hold the lime to avoid waste, since it will flow ahead of the blades.

The windrow is then bladed back to the center to wrap up the lime. It can be left in this position for short periods, even in wet weather, without damage. The materials are then thoroughly mixed by blading. The windrow is cut in half and each half carried out to the crown line. The left is then completely bladed across the road to the right, again forming one windrow. This total is then bladed across the road to form one windrow on the left.

One half is then carried back to the right and the material is laid in by taking a cut from first one windrow and then the other. Because of the whiteness of the lime, the thoroughness of the mix can be determined by eye. The lifts are sprinkled and rolled.

Good laboratory testing here and

every other place in construction and reconstruction is eliminating mistakes, saving time and effort, and making road money go farther.

The Texas Highway Commission is headed by Fred A. Wemple, Chairman. A. F. Mitchell and Robert J. Potts are members. D. C. Greer is State Highway Engineer.

The work in District 14 is under the general supervision of District Engineer W. D. Dockery and District Construction Engineer H. C. Carter.

Portable Compressor

A new large-size portable air compressor has been engineered by Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y. Designated the Gyro-Flow 600 and weighing 9,500 pounds complete, the new unit features a rotary-type compressor which delivers 600 cfm of free air at 100 psi. Major features claimed by the manufacturer are simplicity and low cost of operation and maintenance, reliability, light weight,



The new Ingersoll-Rand Gyro-Flow 600 is a rotary-type compressor which delivers 600 cfm of free air at 100 psi. Its total weight is 9,500 pounds.

and a discharge temperature at least 100 degrees F lower than that of conventional portables.

The compressor itself is a 2-stage oil-cooled rotating-vane compressor. It eliminates pistons, con rods, valves, and the need for a clutch. Air is discharged at less than 200 degrees F under normal operating conditions, I-R says. This, together with thorough oil separation, is said to eliminate hose deterioration.

The Gyro-Flow 600 is driven by a General Motors Series 71 diesel engine—a 6-cylinder 2-cycle engine with 12-volt battery starting and a fast-starting ether system for cold-weather operation. "Uniflow scavenging" provides complete combustion at all speeds and cools valves, pistons, cylinder liners, and heads, the company reports.

Separate engine and compressor stack-type air filters are accessible for frequent servicing when necessary on extremely dusty jobs. Eight-hour-capacity fuel tanks are standard equipment, as are automotive steering, spring mounting, parking reflectors, and mud guards.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 708.

Sheepsfoot Tamping Rollers

A new catalog, Bulletin No. 892, on sheepsfoot tamping rollers has been released by The Baker Mfg. Co. of Springfield, Ill. It stresses the specially Baker-designed feet, shaped to compact soil without disturbing it on pullout.

Baker rollers are made in single, double, and triple-drum models, with tandem hitches available for 3-2-1 or 2-1 operation. Features include spring-cushioned drawbar, universal clevis, forged tampers, replaceable toes, box-section design with double-reinforced corners, shear-type cleaners at front and rear, hardened-steel bushings, and dirt and grease-sealed self-aligning roller bearings.

This literature may be obtained from the company by requesting Bulletin No. 892, or use the Request Card at page 16. Circle No. 707.

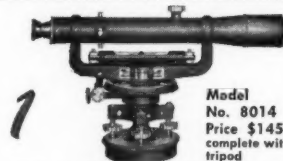
New Eye-Safety Guide

A new revised issue of the "AO Eye Safety Guide" has been prepared by American Optical Co., Southbridge, Mass. Completely illustrated, it contains a careful summary of recommendations made by the Safety Engineering

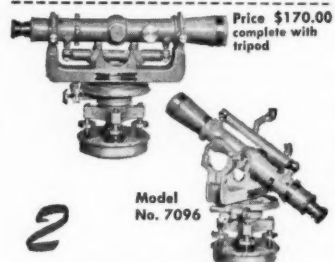
Service Bureau of AO for eye-hazardous jobs throughout many industries. It indicates where eye hazards are most common and the types of protective devices necessary.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 797.

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Model No. 8014
Price \$145.00
complete with tripod
Finest 12" Dumpy Level available anywhere—gives you more features you want, more accuracy, more durability at less money than any other instrument. It has dust and dirt-free internal focusing and has coated optics for clearer distortion-free, sharper images.



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Here's the standard convertible level for the country for the past 30 years! No other instrument has the recognition and acceptance as given to the David White Carnegie Improved Convertible level. Now it's available to you with complete dust and dirt-free internal focusing and coated optics for clearer, sharper, distortion-free images.



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The David White "Universal" level-transit is the most practical and complete builder's instrument on the market. Now available in a new improved model—complete with internal focusing, coated optics—guaranteed vertical arc—in fact every possible feature to assure you lifetime durability and extreme accuracy.

Choose the exact instrument you need from these three. Compare their outstanding features, their precise, yet rugged construction, their accuracy and their price with all others. Then you'll see why we say you'll buy "right" when you buy a David White. For complete information on any one or all three of these instruments, consult our nearest dealer—or write direct to David White Co., 313 West Court Street, Milwaukee 3, Wisconsin.



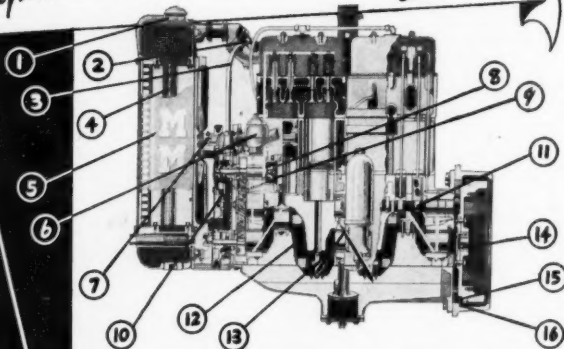
We offer complete, prompt repair service on all makes of instruments—levels, transits, theodolites, etc.

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Because of their extra size and conservative hp rating, MM Industrial Engines are dependable performers that deliver new performance longer. They are designed for continuous heavy-duty operation.

Moderate speed for long life, many low-cost service features, choice of four economy fuels, and ease of installation save you money now and later. MM engines are engineered for maximum economy. High production makes possible high precision at low cost. Standardized design and interchangeability of parts make spare parts more readily available.

Exclusive features of special importance are MM advanced combustion chamber design and free-flow fuel intake. Together they produce high-turbulence and progressive fuel burning to develop high torque at low speeds. This results in plenty of reserve power that enables MM engines to overcome sudden heavy loads without stalling. MM progressive fuel burning also contributes to low fuel consumption and minimum maintenance.

Over 40 years of MM progress in building dependable heavy-duty engines can save you money now and later. Get complete information and specifications from your friendly MM Dealer-Distributor on economical, dependable MM Power Units from 25 to 230 hp.

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or Write

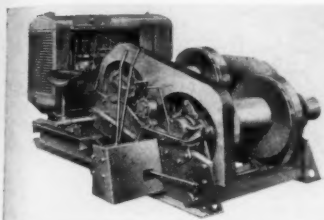
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New York 17, N. Y. • San Francisco 3, Calif.



Clyde's Frame-5 hoists come in 1, 2, and 3-drum sizes with an 8,000-pound line pull. Line speeds range up to 279 feet per minute.

New 4-Ton Hoists

A new series of hoists with an 8,000-pound line pull have been developed by Clyde Iron Works, Inc., Duluth 1, Minn. They are available in gasoline, diesel, and electric-powered models with line speeds up to 279 fpm. Known as Frame-5 hoists, these units are designed for smooth running, ease of operation, safe and positive load control, and low power consumption.

The frame is all-steel, electrically welded, with ductile cast-iron bearing housings. Cable drums will hold 1,500 feet of $\frac{3}{4}$ -inch rope, 2,000 feet of $\frac{5}{8}$ -inch rope, or 3,700 feet of $\frac{1}{2}$ -inch rope. The internal-expanding asbestos-lined friction bands are said to provide smooth and easy load control; they can be replaced without removing the drum. Clyde reports that the large-diameter brakes allow the operator to "toe" the brake with full load control. The Frame-5 hoists are made in 1, 2, and 3-drum sizes.

A one-drum bull-wheel swinger can be attached to the 2 or 3-drum hoist. This unit is mounted off-side to permit unobstructed rope clearance from any drum. Swinging is controlled by a single hand lever. Line pull on this unit is 6,000 pounds.

A detailed description and complete specifications on these units may be secured from the company by requesting Circular MP-44. Or use the Request Card at page 16. Circle No. 723.

New Hard-Facing Rod

The Alloy Rods Co., 7205 W. Market St., York, Pa., has announced the production of a new oxyacetylene welding rod for hard-facing against medium impact and high abrasion. Wear-Flame 40, is a centrifugally cast hard-facing rod consisting of wear-resistant chromium carbides contained in a hard iron-chromium-manganese-alloy matrix.

Wear-Flame 40 overlays are designed to offer resistance to wear on parts subjected to medium impact and compression. Hardness is retained at relatively high temperatures. Hardness of deposited metal is 56-58 Rockwell C. Sizes available are $\frac{1}{8}$ -inch diameter by random lengths and $\frac{3}{16}$ to $\frac{3}{8}$ -inch diameters in 14-inch lengths.

Further information can be secured from the company. Or use the Request Card at page 16. Circle No. 799.

General-Purpose Paver

An 8-page catalog on the 16-E Twinbatch paver, a unit designed as a combination paver and general-purpose mixer, is available from the Koehring Co., 3026 W. Concordia Ave., Milwaukee 16, Wis. Features highlighted in the bulletin include rubber-tired mobility with speeds to 6 mph, a 60-degree elevating boom, bucket discharge at a height of 21 feet, fast charging with a 7-second skip hoist, and a top output of 86 batches an hour on a 60-second mixing cycle.

Special attention is paid to the steering mechanism, water tanks, bucket, skip, batch meter, and drum. Illustrations show the 16-E Twinbatch working on highways and buildings, and set up as a central mix plant for batching. Complete specifications and a detailed dimensioned diagram are included in

the catalog.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 728.

Earth-Moving Equipment Powered by Diesel Engines

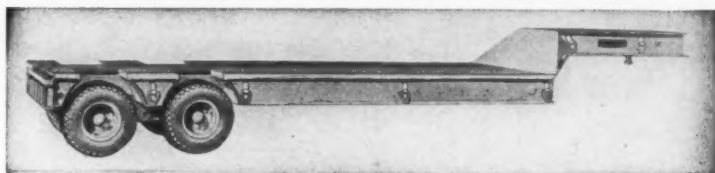
Two 16-page booklets covering Cummins and General-Motors-powered Euclid equipment have been prepared by The Euclid Road Machinery Co., Cleveland 17, Ohio. These list by model number the various diesel engines and the Euclid equipment in which they are available. Cutaways show the features of the engines; the Euclid equipment is also illustrated.

The catalogs give specifications for the Euclid rear-dump and bottom-dump hauling units, scrapers, and loaders, plus lists of engine dealers and Euclid distributors in the United States and Canada.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 794.

SOLVE YOUR HAULING PROBLEMS WITH A "TRANSPORT TRAILER"

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CARGO CARRIER MODEL GPX (Semi) with Tandem Axles

PATENTED TANDEM AXLE ASSEMBLY—Featuring unusual lengthwise and side-wise wheel accommodation to irregularities in the road. Use of full width tubular, forged, heat treated axles with CAMBER.

FRAME—Constructed of beam sections throughout, electric welded. A ruggedly strong and efficient unit with minimum weight.

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For tight, durable, maintenance-free expansion joints between concrete slabs—leading engineers and architects have long specified Flexcell* Joint Filler! No bulges, no gaping crevices! Flexcell absorbs compression without extruding... expands on release of pressure to fill joint. Low in first cost, it gives continuing savings on maintenance. Withstands severest service, extremes of heat and cold. Superiority proved in years of performance on hundreds of America's most famous highways, bridges and airport runways!

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- 4. TOUGH, DURABLE**—Long life and economy proved by years of service on hundreds of famous projects!
- 5. EASY TO WORK WITH**—Flexcell Joint Filler is light, easy to install. Gives neat, finished joints with no trimming. Outstanding for work involving special cutting, tapering and fabricating.
- 6. ONLY FLEXCELL**—of all expansion joint fillers, is made of long, remarkably strong Louisiana cane fibres—and protected by the exclusive (patented) Ferox® Process against fungus, dry rot, termites.

Builds Substructure For Long River Span

Dravo Corp. Constructs Eight Piers and Two Abutments for Allegheny Crossing on West End of Penn Turnpike

By WILLIAM H. QUIRK,
Eastern Editor

• THE longest bridge on the 67-mile western extension of the Pennsylvania Turnpike has eight piers and two abutments, recently constructed by the Contracting Division, Dravo Corp., of Pittsburgh, Pa. The 2,179-foot span crosses the Allegheny River near Oakmont, Pa., about 10 miles northeast of

Pittsburgh, and is the second-longest bridge on the entire Turnpike. The longest is the 4,526-foot bridge which carries the eastern extension over the Susquehanna River downstream from Harrisburg.

Construction on the Allegheny crossing began in March, 1950, after the Pennsylvania Turnpike Commission awarded the substructure contract to Dravo Corp. on its low bid of \$914,818. The same contractor also built the substructure for the Beaver River bridge, the second key span on the western extension. The latter structure, located about 30 miles northwest of Pittsburgh, is 1,540 feet long with six piers and two abutments; the low-bid contract was \$597,489.50.

The substructure for the Allegheny River bridge was completed in December, 1950, well within the time limit. The superstructure is being erected by the American Bridge Co. under a \$2,135,576 contract scheduled to be finished by this summer.

Allegheny River Bridge

Located in Allegheny County, the new bridge crosses the Allegheny River
(Continued on next page)

C. & E. M. Photos



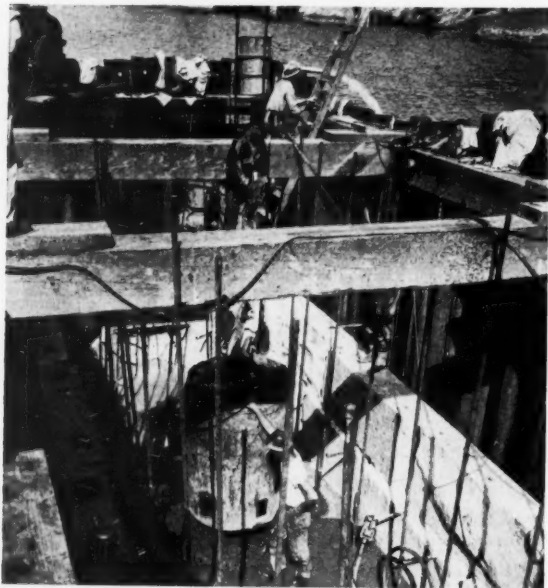
An Owen clamshell from a floating rig removes material from the cofferdam built for pier 8 on the left bank of the river. Steel sheeting holds the steep bank in place.



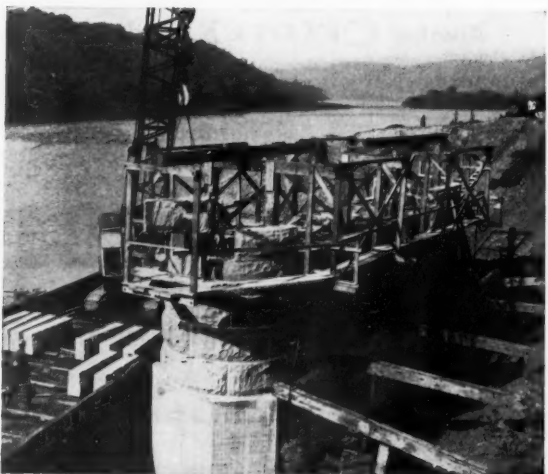
Derrick boat No. 1 swings a bucket of concrete from the floating plant, fitted out with Dravo equipment, to the cofferdam of pier 5.



A 2-yard mixer on the plant discharges concrete from its drum into a 2-yard bucket.



Inside the cofferdam of pier 5, stone masonry serves as a form for the concrete. Pier 5 has a tremie pour 28½ feet deep.



At pier 4, a Link-Belt Speeder, barge-mounted, sets limestone blocks for the masonry construction.



These land piers are 2-column reinforced-concrete structures founded on sand and gravel. Footings are 60 x 18.

on a nearly north-south line, with the north or right-hand bridgehead situated between Harmarville and Cheswick. Oakmont, on the south or left descending bank, is just below the bridge. Upstream about 300 feet from the new turnpike span is the double-track Bessemer & Lake Erie Railroad bridge. Along both banks the vehicular structure crosses over tracks of the Pennsylvania Railroad.

Piers are numbered consecutively from the right to the left bank, the first span between the right abutment and pier 1 being 104.35 feet. The remaining spans in order to the left abutment are: 130.42, 130.42, 106.31, 267.98, 346.67, 346.73, 533.33, and 212.96 feet. The first four shorter spans have girder superstructure construction, while the remaining five longer spans are trusses. Between piers 7 and 8, the longest span, is the river channel where a horizontal clearance of 500 feet is provided. Piers 1, 2, and 3 are on land, while the others are considered to be river piers. Pier 8 is up against the left bank, pier 4 lies close in to the right bank, while piers 6 and 7 straddle Fourteen-Mile Island, a narrow piece of land in the middle of the river.

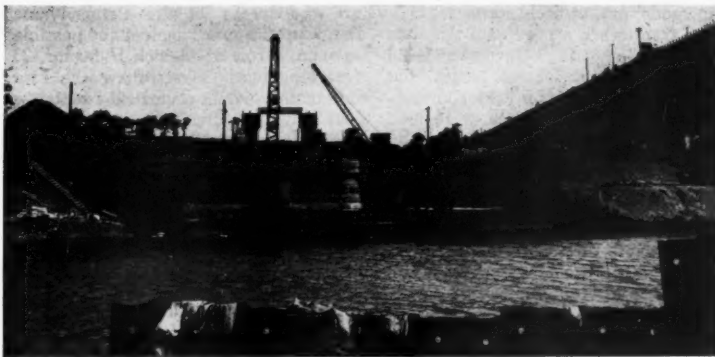
In order to facilitate the movement of personnel boats and floating equipment from one side of the river to the other, the contractor as one of his first steps cut out a channel between Fourteen-Mile Island and Twelve-Mile Island lying farther downstream. In this way the water journey was shortened between opposite banks. At the bridge site the river pool is at elevation 721.0, while the top of the narrow, sandy island is about 18 feet above the level of the water. Close to the shore the river is only about 3 feet deep, but deepens progressively from the land. The deepest of the river piers is founded on solid rock approximately 50 feet below normal pool elevation.

Land and Water Piers

Land piers 1, 2, and 3, two-column reinforced-concrete structures, are founded on sand and gravel with footings measuring 60 x 16 feet. These land piers on the northern bank average 78 feet in height from the bottom of the footings, with the tallest rising 111 feet. The columns of these piers are rounded at the ends, and connected at the bottom by a diaphragm and an arched section at the top.

Pier 4, just offshore, has a 62-foot x 19-foot 6-inch footing with a 10-foot-deep tremie seal topped by a 19-foot distribution block. Above that are nine courses of limestone, 23 feet 4 inches in height, up to elevation 755.4, the high-water line. The stone masonry serves as a form for the concrete placed in the pier. Piers 5, 6, and 7, out in the river, have deeper tremie pours of 28½, 33, and 31 feet respectively, and average around 70 x 19 feet in length and width. Pier 8, up on the bank and with a cell cofferdam fronting the river, has a similar-size footing that was poured in the dry without having to resort to a tremie seal.

Piers 5 through 8 are faced with granite from the top of their distribution blocks to elevation 729.0. From that point to the top of the piers, limestone is used for the facing except for the upstream nose which is granite.



L. & E. M. Photo

From pier 5 of the Turnpike Allegheny River crossing, looking back at pier 4, where a Link-Belt Speeder, on a barge, sets stone.

Above the distribution blocks the piers range from 50 to 58 feet in height, and are 10 feet wide at the top. They support the trusses and girders spaced 42 feet 6 inches apart on centers. The bridge deck consists of two 26-foot roadways separated by a 4-foot median,

and with a 2-foot 6-inch curb on each side.

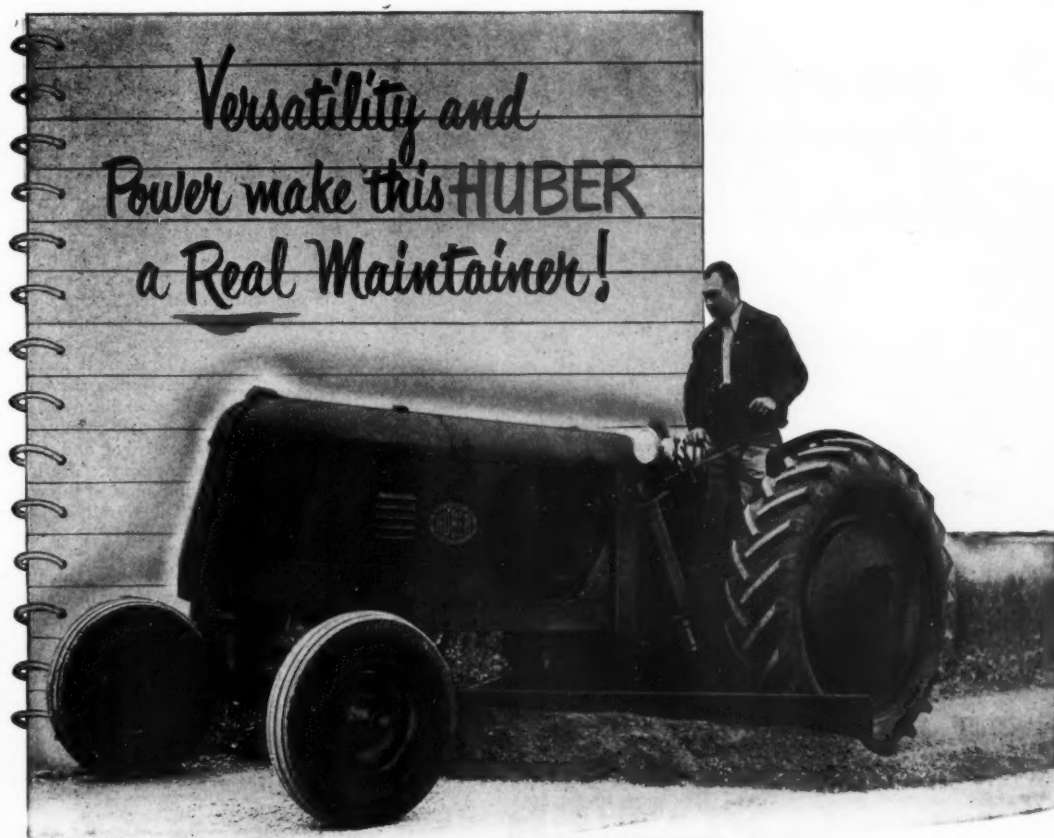
Construction Operations

The project resolved itself into three main operations: pier and abutment excavation; pile driving; construction of

the stone-faced and concrete-masonry structures. Work started first on pier 4, followed by pier 5, while the three land piers 1, 2, and 3 were also being built at the same time. Construction on the other river piers got under way a short time later. Part of the work on land included the laying out of a detour for State Route 28, which ran along the right bank between the land piers.

For what was essentially a marine job, the Dravo Corp. moved to the site a well rounded fleet of floating equipment powered by coal-burning boilers. The bulk of the excavation, pile driving, and material handling was done with three derrick boats—DB-1, DB-19, and DB-21 fitted out with 75, 85, and 80-foot booms respectively. The DB-21 was equipped with a 4-yard clamshell bucket for excavating at the pier sites. Masonry for the pier facing was mostly set by a Link-Belt Speeder crane having a 60-foot boom and mounted on a barge. Three other barges were used

(Continued on next page)



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Builds Substructure For Long River Span

(Continued from preceding page)

for carrying materials and supplies. For land work a Northwest No. 6 crane saw service.

The floating rigs were positioned at the different sites by means of lines and casting weights, and secured in place with spuds. A Sea Mule maneuvered the material barges around when necessary.

Sheet-Pile Cofferdams

Before driving the steel sheet-pile cofferdams for the river piers, the contractor first pre-dredged the river bottom of its gravel overburden. Three sets of frames were available for the cofferdams. They were made of steel and timber, measuring 75 feet long x 20 feet wide, and from 25 to 32 feet in height. Two derrick boats lowered the frame into position, while a third boat secured it to the river bottom with

four spuds, one at each corner.

The framework served as a template for the steel sheeting—Carnegie M-116 sections—49 to 58 feet in length that were driven to rock by a McKiernan-Terry 9B3 hammer. They were toed in slightly at the bottom, and internally braced with rings of 24-inch H-beams which were cross-braced with either 12 x 12's or 16 x 16's. Two sets of rings sufficed for a cofferdam. The final excavation inside the cofferdams was done with an air lift, and the work was inspected by a diver before any tremie concrete was placed. The piers go down 38 to 50 feet below normal pool elevation.

In constructing pier 8 up on the left bank, a row of cellular cofferdams was constructed along the river side of the structure. This row consisted of seven cells, 15 feet in diameter, made up of M-110 and M-112 steel sheet-piling sections from 17 to 18 feet in length, and driven to rock by the 9B3 hammer handled by a derrick boat. Above the steep bank at the rear of the pier site

are the tracks of the Pennsylvania Railroad. To guard against any possible cave-in, a row of 12-inch H-beams, 20 feet long, was driven along the rear line of the pier in a vertical row on 7-foot 8-inch centers. Between these vertical H-beams and the cell cofferdams, a series of 16 x 16's were inserted for cross bracing. Then a row of M-115 sheet piles, 25 feet long, was driven between the H-beams to form a protecting wall 70 feet long, preventing any slides of the steep hillside.

Within this cofferdam the rock was broken up by jackhammers powered by an Ingersoll-Rand 500-cfm air compressor. The material was removed by an Owen 2-yard clamshell bucket. All the heavy work at this pier was done with floating equipment.

Concreting

Concrete for the job was mixed on a floating plant, No. 6 mixer boat fitted out with Dravo equipment including aggregate bins and a 2-yard mixer. An 85-foot boom with a 1½-yard clamshell bucket transferred the concrete aggregate from supply barges tied up at the side to the storage bins of the plant. The Iron City Sand & Gravel Co. of Pittsburgh furnished the sand and gravel. Green Bag cement from Neville Island, Pittsburgh, was supplied in bulk to the job in a 2,500-barrel cement barge. From the barge it was blown up to the mixing plant through a Fuller Kinyon 4-inch line. Water for the mix was pumped from the river.

Pier 6 took the largest tremie-concrete pour—1,835 cubic yards, poured in slightly under two days of continuous concreting. After the seals were in, the cofferdams were unwatered before the distribution blocks were poured. Pumping equipment included a Lawrence 12-inch pump driven by a Wisconsin gasoline engine; a 3 and a 4-inch LaBour electric pump; a 6-inch Jaeger; a 6-inch Novo; and two 4-inch Gorman-Rupp pumps. The usual practice was to pump most of the water out with the big 12-inch unit, and then keep the cofferdam dry with a combination of smaller pumps.

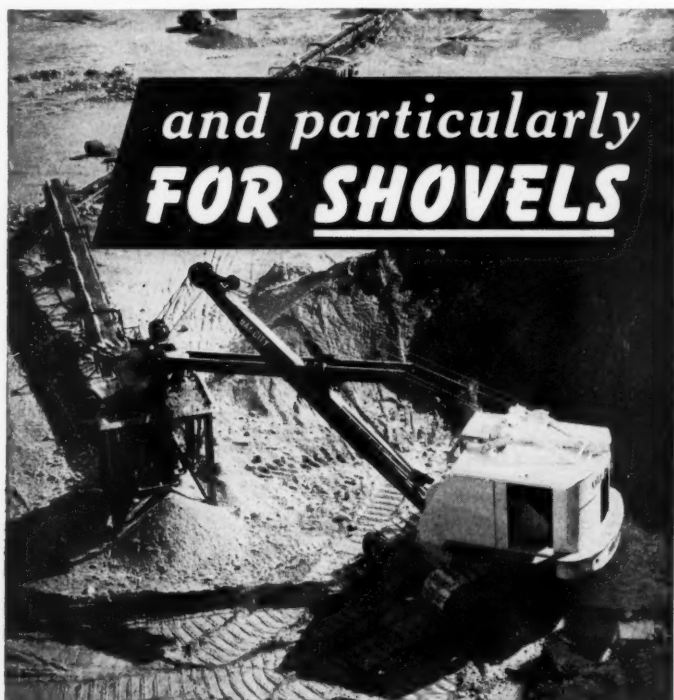
In pouring the land piers, the floating mixer filled buckets with concrete which were then set on trucks that backed down to the shore. The trucks then hauled the buckets to the structure being built where a crane swung them to the forms. Wooden forms,

where needed, were built with 1-inch sheathing lined with ¼-inch plywood, and backed with either 2 x 8 or 2 x 10 studs. Double 3 x 6 or 3 x 8 wales were used, held by Universal Spi-Ro-Loc ties, 1½ inches in diameter.

Stone-Faced Piers

Limestone for the pier facing came from the Indiana Limestone Co., Inc., of Bedford, Ind., while the granite came from Mt. Airy, N. C. Where the granite was used on piers 5, 6, 7, and 8, it was laid to a height of 18 feet and then followed by limestone. The stone blocks were built up in two courses at a time, held together by strap and cramp

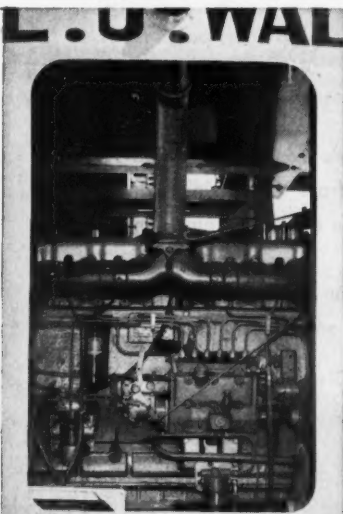
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The shovel you're watching here is working for Lyle J. Walker, a sand and gravel plant operator, at New Hudson, Mich. It's a Model 65 Bay City Shovel with a 25-ft. boom, 20-ft. dipper sticks, and a 1¼ cu. yd. dipper—powered by a Model 148-DK Waukesha Diesel.

Mr. Walker operates five additional Waukesha-powered shovels—Model 45 Bay City Shovels with Model 6-SRKR Waukesha gasoline engines.

Get Waukesha Diesel details in Bulletin 1532.

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anchors, and also doweled into the concrete making up the core of the pier. Both the beds and joints are mortar, $\frac{3}{4}$ inch thick. The stone masonry served as a form for the concrete, which was placed in lifts coming to within 6 inches of the top of a two-course layer.

Steel reinforcing for the piers and abutments was supplied by the Carnegie Illinois Steel Co. of Pittsburgh, Pa., while the fabricated structural steel for the contract came from the American Bridge Co. Concrete was placed with 1 and 2-yard buckets, and cured with burlap and water. The stone masonry was set by floating rigs.

Quantities and Personnel

The major items in the substructure contract for the Allegheny River bridge included the following:

Rock excavation	6,570 cu. yds.
Wet excavation	2,440 cu. yds.
Land excavation	10,380 cu. yds.
Class A concrete	2,247 cu. yds.
Class B concrete, footers and tremie	7,556 cu. yds.
Reinforcing steel	135,300 lbs.
Structural steel	129,330 lbs.
Stone-faced masonry	6,422 cu. yds.

The Dravo Corp. employed a force of between 50 and 60 on the contract under the direction of B. N. Parker, Superintendent.

For the Pennsylvania Turnpike Commission M. L. Duncan was Resident Engineer. George T. Chapman is Division Construction Engineer in charge of Western Extension projects, and A. H. Brill, District Construction Engineer. The Commission is headed by T. J. Evans, Chairman; R. B. Stone is Chief Engineer, and John D. Paul, Assistant Chief Engineer.

ACI Revises Building Code, Presents Awards, and Elects

At its 47th Annual Convention in February in San Francisco, the American Concrete Institute approved revisions in its Building Code Requirements for Reinforced Concrete. The revisions, which are designed to save steel, have now gone to ACI members for ratification.

The changes decrease the allowable bond stress in plain bars (including the old types of deformed bars) and increase the allowable bond stresses for the new types of bars over those previously allowed for the old bars. Top bars, those having more than 12 inches of concrete under them, are assigned lower bond stresses than bars in other positions. Under the revisions, all plain bars must be hooked, which corresponds to special anchorage under the old provisions. The new reinforcing bars develop sufficient anchorage by bond alone to correspond to special anchorage with the old-type bars; that is, hooks are not necessary and less total steel is required.

Five awards were presented at the convention. The Alfred E. Lindau Award for outstanding contributions to reinforced-concrete design went to Charles S. Whitney, partner in the firm of Ammann & Whitney, consulting engineer of Milwaukee and New York. The Construction Practice Award went to W. S. Colby, structural engineer of Stone & Webster Engineering Corp., Boston, for his paper "Design and Construction of a Circulating Water Intake", published in the March, 1950, *ACI Journal*. The Wason Medal went to J. R. Leslie and W. J. Cheesman, Research Engineer and Assistant Research Engineer, respectively, for the Hydro-Electric Power Commission of Ontario, for a paper in the September, 1949, *ACI Journal* describing the use of the Soniscope for studying deterioration and cracking in concrete structures. Harry F. Thomson, Manager of the Redi-Mix Concrete Division of Material Service Corp., Chicago, received the Wason Medal for "the most meritorious paper" of the volume year—"Specifications Should Be Realistic",

November, 1949, *ACI Journal*.

Mr. Thomson was also elected President of the Institute during the convention. He succeeds Frank H. Jackson, Principal Engineer of Tests, Bureau of Public Roads. Chosen for a 2-year term as Vice President of the Institute was Henry L. Kennedy, Manager of the Cement Division of Dewey & Almy Chemical Co. A. T. Goldbeck, Engineering Director, National Crushed Stone Association, who was elected in 1950 for a 2-year term as Vice President, continues in that office.

For Masonry Anchoring

A handy pocket-sized bulletin describing a complete line of masonry anchoring, fastening, drilling, and allied products has been issued by U. S. Expansion Bolt Co., York, Pa. The products are illustrated, and specifications and prices are tabulated.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 801.

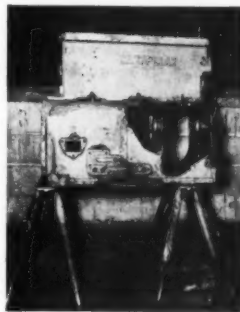
Hydraulic Pullers and Jacks

Applications of hydraulic pullers and jacks are discussed in an 8-page bulletin, "Hydraulic 51", issued by Templeton, Kenly & Co., 1020 S. Central Ave., Chicago 44, Ill. The bulletin also describes Simplex Re-Mo-Trol hydraulic pumps and remote-controlled rams. It illustrates how these units are designed to simplify rigging and improve safety

in numerous pulling, pushing, and lifting operations, by means of Center-Hole tubular ram construction.

Complete specifications of Re-Mo-Trol units and all other Simplex hydraulic jacks and pullers are included. Accessories and attachments are also described.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 795.



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From time to time the giant shovels must be moved to new


locations. That's where Badgett calls on GMC Model HDCWX 988, shown above giving a lift to a shovel with a mammoth appetite—one that can scoop up five tons of coal at a single bite.

Little wonder the Badgett people agree with Scotty McGaw, GMC dealer in Madisonville who sold them the equipment: "These Diesels can haul bigger loads, haul them faster, and save you 56% on fuel costs alone—enough to pay for the new equipment in the first 300,000 miles!"

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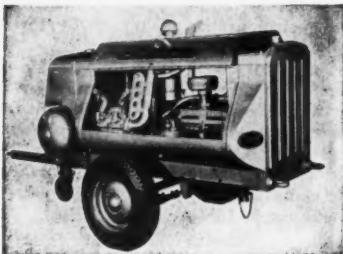
½ TO 20 TONS



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GENERAL MOTORS



Gardner-Denver's Model WH-105 air compressor is now powered by a Hercules QXD-5 gasoline engine.

Portable Compressor Gets New Gas Engine

A recent announcement discloses that the Gardner-Denver Model WH-105 2-stage portable air compressor is now powered by a Hercules QXD-5 gasoline engine. The QXD-5 is a 6-cylinder engine with a 3 1/8-inch bore and 4 1/2-inch stroke. The piston displacement is 230 cubic inches.

The crankcase and cylinder block of the engine are cast integrally to provide perfect alignment of crankshaft bearings and cylinder bores, Hercules says. The 7-bearing crankshaft is machined, heat-treated, and balanced. Both main and connecting-rod journals are Tocco-hardened. Bearings for these are brass-back Babbitt-lined, and are replaceable. Pistons are of lightweight aluminum alloy with four rings: one oil ring and three compression rings above the piston pin. The three compression rings are Ferrox-filled to prevent cylinder-wall scuffing.

The engine has an oversized gear-driven oil pump which provides pressure lubrication to all main connect-

ing-rod and idler-gear bearings. Cooling is by full-length water jackets around all cylinders and by a positive gear-driven water pump. The water pump is designed to eliminate misalignment and undue wear on vital parts.

The Model WH-105 Gardner-Denver compressor is an all-water-cooled 105-cfm unit. Air is compressed to 28 pounds in the first stage, cooled back almost to atmospheric temperature in a radiator-type intercooler, and boosted to final discharge pressure in the second stage. The Gardner-Denver unloader pilot operates the suction unloading valves within a fixed range, and automatically throttles the engine to idling speed and unloads the compressor. The engine accelerates to full operating speed just prior to the compressor going on load. The Model WH-105 is furnished on 2 or 4-wheeled spring-mounted running gears and also on wood skids for truck mounting.

Further information on the compressor may be obtained from Gardner-Denver Co., Quincy, Ill. Details on the engine may be obtained from the Hercules Co., Canton, Ohio. Or use the Request Card at page 16. Circle Nos. 805 or 806 respectively.

Data on Ventilating Fans

An illustrated 12-page catalog on ventilating fans is now available from the Herman Nelson Division, American Air Filter Co., Inc., Moline, Ill. It describes and illustrates the applications of the 6 basic models of propeller fans manufactured by the firm.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 776.

Data on Cleaning Operations

A booklet on machinery cleaning, rust inhibiting, and the removal of rust-preventive coatings is offered by The Du Bois Co., Cincinnati 3, Ohio. It treats actual operations and explains methods and processes.

It features the cleaning of stationary machinery, motors, bearings, and other machine parts. It describes rust inhibit-

ing, and dual cleaning with rust-inhibiting operations. A specification sheet on the removal of rust-preventive coatings from machinery, equipment, and tools is included—also a 2-page leaflet on the general applications of Actusol, Du Bois emulsifiable solvent cleaning compound.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 802.

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By RAY DAY

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• "WE'VE got just five ways to save our roads, and we need to exercise them all, or else . . ."

"Get tough about loading. Protect our maintenance manpower. Make equipment and parts more available to highway departments than it was in the last war. Enlarge maintenance programs by contract. Develop reciprocity between states to fight any kind of disaster."

The man who spoke those words of warning isn't a highway engineer anymore. He's a rancher. He grows fine oranges. Most any morning you can find him in his groves near San Bernardino, Calif. Maybe he'll be driving a tractor. He'll play his knowledge of highways down until he betrays it by his incredibly broad grasp of the subject. For it's a safe bet that this wiry, snow-haired man of seventy-odd years is as well versed in the complexities of highway maintenance as any living person in the United States.

J. S. Bright, former Deputy Commissioner of Public Roads until he left Washington, D. C., in August of 1949, is known as "Mr. Maintenance" by engineers all over this country. He is the man who sparked the original drive within the American Association of State Highway Officials to give maintenance the recognition it deserved. He is the man who directed field construction of the Alaska Highway in 1942 and 1943.

You could pardon Bright if, in the leisurely hours of his sunlit orange groves, he looked up at the snow-shrouded summit of Mt. Baldy and reminisced on the past. For his accomplishments are many. But for him, the California sun generates an opposite line of thought. Bright looks to the future, not only in highway matters but everything else. As we drove out to his ranch, he pondered the possibility of improving the performance of smudge pots, and wondered in lucid fashion exactly how MacArthur would get out of the jam in Korea.

But highways are never far from Bright's mind, and any conversation with him usually leads to that subject. To Bright, the lessons of the past seem crystal clear, and he thinks they must now be applied intelligently to save the tremendous investment in our highways in the critical years ahead.

"We ended World War II with our highway system badly damaged . . . and that's an understatement," he analyzes. "Maintenance had been neglected. We needed to rebuild."

"So what happened? We didn't rebuild as fast as we should have, for various reasons. We're spending \$1,500,000,000 a year today for maintenance. If you take the declining value of a dollar into consideration, you've got to admit we're doing only the same

amount of maintenance work we were doing in 1940."

Bright gets deadly serious when he contemplates that situation. You sense the sincerity of his concern.

"It means that we're doing about the same amount of maintenance on a highway system that needs repair maybe three or four times as much!"

Bright's analysis is anything but over-simplified. It is his way of getting to the heart of a problem and coming up with an answer people can understand. They tell a story on Bright,

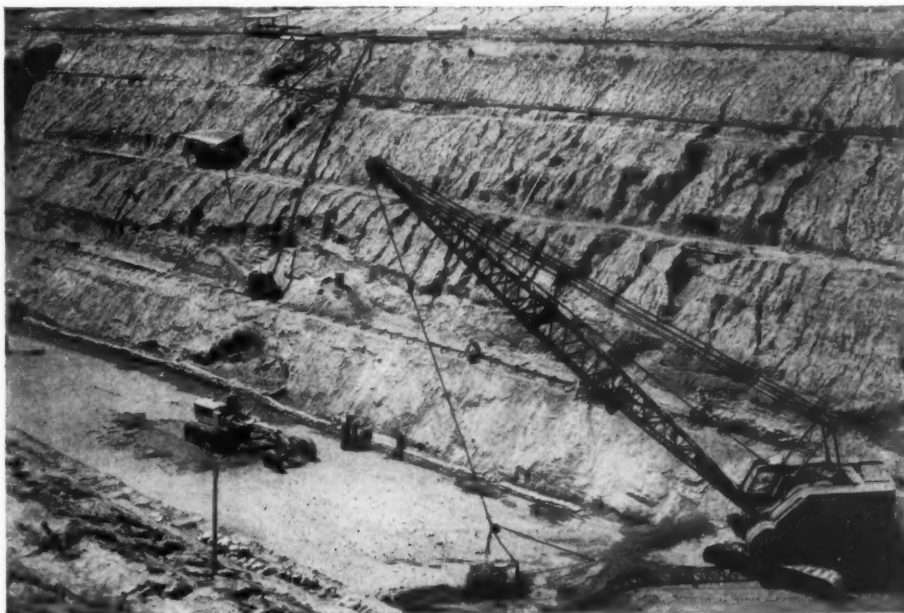
(Continued on next page)



C. & E. M. Photo

J. S. Bright, "Mr. Maintenance" of the road-building business, relishes retirement in one of his orange groves in California.

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Roebling makes a wide range of wire rope . . . brings you the right construction, grade and size for top performance and economy on each installation. Have your Roebling Field Man help select the best rope for your particular requirements. And for maximum savings, get his suggestions on the proper use and maintenance of wire rope. He knows the case histories of thousands of installations. John A. Roebling's Sons Company, Trenton 2, New Jersey.

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"Mr. Maintenance"

Looks to the Future

(Continued from preceding page)

when he was in charge of the Alaska Highway, about a report that was submitted to him. It seemed that a survey party had not been able to move as fast as it should have because a bull moose interfered, and occasionally chased the surveyors away. The report at one point explained, "Operations were necessarily curtailed, and the surveyors expedited their departure."

Bright grinned when he read it and said, "So they ran like hell. I wonder if the moose caught 'em."

The story may or may not be authentic, but it explains Bright's directness that he applies to the highway problem. If the international situation gets worse—and Bright believes it will before it gets better—new construction is bound to be curtailed somewhat, even though it shouldn't be. Thus the only solution is modernized maintenance. There are five things maintenance engineers must do, and must convince the public are necessary. First—

Get Tough About Loading

This time, more than ever before, highway engineers have got to get tough about the loads our highways have to take. In the last war, any overload had to be handled because "it was part of the war effort."

"Now that highway system is just as big a part of our war-effort assets as any overload," Bright explains. "Why shouldn't it be protected by strict control and rigid enforcement? Even if it means putting an ironclad clause in future war-contract specifications, our highways must be protected at all costs."

Bright can prove that our highways are being used for warehouses. For example, the automobile industry in Detroit uses auxiliary parts—ball bearings, to give an instance—from New England and other parts of the country. These small parts are fed into the assembly line on a precise schedule, by means of truck shipments. It is a fine tribute to industrial achievement that manufacturing methods have been improved to the point where auxiliary parts are stored in rolling warehouses, but that's no reason, Bright believes, for overloading the trucks beyond the axle loads the highways were designed for.

"And another thing along that line," he says, "we've got to get better enforcement of speed, particularly on these big trucks. Why, I drive 55 miles an hour and some of these big trucks pass me like I was standing still."

Nothing that we can do along this load-control line will be unfair, because as Bright points out, studies are showing conclusively that heavy loads do cause severe damage.

Protect Our Maintenance Men

In World War II, draft boards snapped up maintenance men with little thought of deferment. This time, Bright believes, maintenance men ought to be protected.

"And that means some younger men, too," he said. "All you've got to do is visualize how important a trained maintenance man will be in case of disaster bombing. It's going to be a job that calls for training and experience. Sure, I know, Sam Baldock got 'Rosie the Riveter' to run maintenance equipment in the last war. And maybe you could use women in this emergency strictly to run equipment. But you're going to have to have men with stamina and know-how if disasters happen."

"Trained maintenance men will more than earn their deferments if they'd take maintenance out of politics, run it right, and keep them on the job," Bright said.

Along this line, Bright urges even

more comprehensive training programs for maintenance men. If the bombing scares occur, as he believes they might, certainly a maintenance man will have to exercise self-reliance and display the results of thorough training beyond anything most of them are getting now.

Make Equipment, Parts Available

Bright remembers all too well, from Alaska Highway days, how difficult it was to get spare parts or new equipment. This time, there should be a better stockpiling or working agreement with all manufacturers of equipment, so that more parts are made.

"It gets to be a complex thing when you think about it," he says. "Spare parts must be made in greater quantity this time, even though several manufacturers imply there's more profit in the manufacture of new equipment. This time we've got to keep all the machines rolling."

Exactly how it will be accomplished is anybody's guess, but Bright is serious when he points to the moral issues

of this problem, and he says this time state highway departments simply must have access to more new equipment and parts than they had in the last go-round. Bright thinks that several states, particularly the smaller ones, could pool parts and materials to their advantage.

Maintenance Work by Contract

I intended to ask Mr. Bright what

he thought about the contract system, as opposed to force account, but he was too fast. He answered it before the question was asked by saying, "And we've got to do something about the volume of maintenance, too."

He takes an interesting view of force-account maintenance because he is utterly practical. Industrial methods and especially methods of production

(Continued on next page)

Would you rather spend 80c to clean

and rust-proof the cooling system of your equipment each spring and fall, and keep the equipment rolling, or wait till it is "dead lined" with a clogged radiator and have to spend ten to twenty dollars—or more. The above figure of 80c is based on an average 5-gallon capacity car or truck, calling for a unit measure of M-K POWER FLUSH Cooling System Cleaner and a similar charge of M-K RUSTRITE Inhibitor, where both items are packed in bulk. For premeasured packages, the cost will run somewhat higher.

M-K POWER FLUSH is a NON-ACID radiator and block cleaner. It can be left in the cooling system while the equipment is in use. Does not require neutralization. M-K RUSTRITE is a combined rust inhibitor and water pump lubricant, to be put in after the system is cleaned and left in all season. Write for samples and prices. Please state how many pieces of equipment to be served and average capacity. We will recommend suitable quantities to cover.

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MA 4712

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▲ Finished bridge approach takes shape as screed smooths the concrete over Bethlehem Bar Mats. Float finish already applied behind screed.

Road Improvement in Bucks County, Pa.

A recent road-improvement project authorized by the Pennsylvania Department of Highways involved the construction of a bridge, plus approaches, on Route 178, near Doylestown, Pa. These on-the-job photographs show various phases of construction of the approaches and the bridge itself. Contractor: J. D. Eckman, Atglen, Pa. Bridge reinforcing, bar mats and dowel units were furnished by Bethlehem.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation

STEEL FOR HIGHWAYS



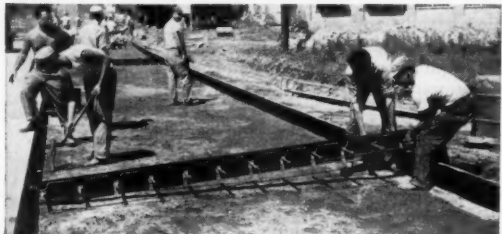
Dowel Units • Reinforcing Bars • Bar Mats • Guard Rail
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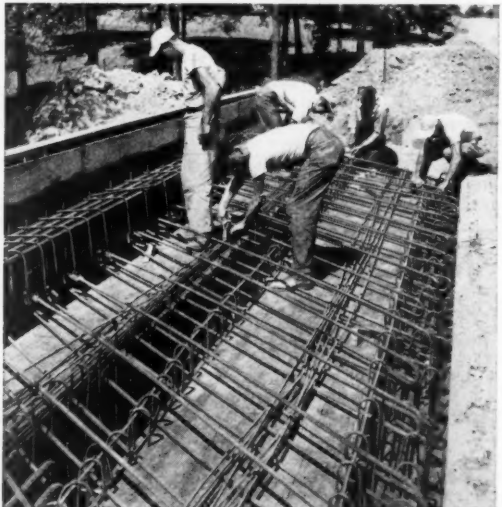
▲ Placing Bethlehem Hinged Bar Mat over first course. The hinged portion of mat folds over double. Mat can be handled easily by two men.



▲ Scraper moves into position for finished grading. At right background, paving proceeds at fast pace. Note finished lane, left of scraper.



▲ Workers place Bethlehem Dowel Unit. The unit is designed to keep dowels accurately aligned in concrete, both horizontally and vertically.



▲ Showing Bethlehem Reinforcing Bars being tied, prior to pouring concrete for bridge. Bars have high lugs to prevent slippage in concrete.

analysis should be introduced into maintenance. Frequent unit-cost analysis of the methods of performing maintenance should be made and compared with costs of contract work, Bright believes. He says, "Competition of contractors in the maintenance field would be healthy in many of the states. Let the most efficient man get the job."

Bright's thinking about the volume of maintenance is this: the emergency will be on us fast. New construction of wide freeways may be curtailed, but much betterment and improvement could be done by maintenance-betterment contracts. It would put new usefulness in old highways and make them last perhaps through the crucial period.

Bright would like to see Federal money set aside for this work on a Federal-Aid basis. The jobs would consist of resurfacing, pavement widening, minor corrections of alignment and grade, and so on. Bright would like to see the jobs administered by the several state highway departments, and the work done by private contracting firms.

When the possible duration of a lengthy emergency period is considered as Bright considers it, the expenditure of money for betterment contracts seems wise, even though some of the highways might need better alignment. "Worry about alignment ten years from now, when it might be possible to rebuild," is Bright's advice.

Wouldn't the extension of Federal Aid to maintenance work reduce the sovereign rights of a state highway department?

"Maybe. I don't think so, if the boys keep their eyes open and meet their responsibilities," was the answer.

Develop Reciprocity Between States

If states are to survive through war disasters, bombings, or even bad storms, some thought must be given to agreements in the future which will let one state help another. The bad snowstorms in Wyoming, Utah, and other western states two years ago focused Bright's thinking on this problem, and he believes it is even more important in the present emergency.

Many practical difficulties exist. In the bad snow two winters ago, for example, Minnesota sent some snowplows out to help South Dakota. So far as the law was concerned, Minnesota had no legal right to let the equipment leave the state. A special Minnesota law had to be hurriedly passed. Fortunately the Minnesota Legislature was in session at the time. Without such a law, the operators were not legally covered by workmen's compensation in case of an accident. If a motorist happened to crash into a Minnesota snowplow working on a South Dakota highway, a Philadelphia lawyer and four Supreme Court Justices would be hard-pressed to settle the lawsuit.

It is not going to be an easy task to develop the necessary working agreements, but Bright believes they are vital in case of an invasion of this country, and desirable otherwise.

So far as any invasion is concerned, Bright doesn't agree with the military experts that it will come by ground forces through Alaska. He is still an ardent reader and an astute student of arctic conditions, even though he lives in southern California. Remembering those Alaska winters, he says, "Stalin wouldn't get to first base with a land invasion through Alaska. The winters would freeze the equipment, and the summers would mire it in the bog."

Bright was born in San Bernardino in the same block where his home is now located. San Bernardino was a different city then, and the valley was different. There was no smog, and the air was completely free of smoke from industrial plants and over 2,000,000 motor vehicles in the orange belt.

After an early schooling at San Bernardino, Bright studied engineering at

the University of California. His first job was with the Santa Fe Railroad at Williams, Ariz., as a transitman or assistant engineer. Then he spent two and a half years in Mexico with the Southern Pacific.

Bright's background also includes extensive work as a county engineer. For several years he headed the county engineering office at San Bernardino, and served a year as an engineer with the Fontana Water Co. Tulare County wanted him next, but the Bureau of Public Roads put him on the payroll after he had been at Tulare only a short time.

He went to Portland, Missoula, and then to Denver as District Engineer. Bright had the blessed gift of being a good engineer, a good mixer, and a practical construction man. Possibly that influenced his selection as Chief Construction Engineer under the late Dr. Laurence I. Hewes, Chief, Western Headquarters, of the BPR.

That post was a natural springboard for the Alaska Highway, and when

work began in February of 1942, Bright took over. The Alaska Highway epic, a glorious chapter in American construction history, needs no repeating here. When Bright returned to the states in October of 1943 he left behind him a record of high achievement under tough odds. The Alaska Highway was not an easy road to build.

The last years with BPR were spent in Washington, D. C., as Deputy Com-

missioner. Bright's fine personality, distinguished bearing, and friendly smile are familiar to anybody who ever attended the AASHO conventions during the past decade. In August of 1949 he and Mrs. Bright left Washington to return to California after 32 years. Commissioner MacDonald, whom Bright affectionately still calls "The Boss", tried to get Bright to stay on a

(Concluded on next page)

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The Compressor People

WEST CHESTER

PENNSYLVANIA

"Mr. Maintenance" Looks to the Future

(Continued from preceding page)

while longer. Bright reluctantly declined, because he wanted to get back to his orange groves.

When he and Mrs. Bright crossed the California state line, she turned to him and said, "You might have to go back to Washington some time, but so far as I'm concerned, California is good enough for me."

It's good enough for Bright too. Today he enjoys life by working in the oranges during the morning, and sometimes he helps if firing is needed at night. He still makes an occasional speech to local engineer's clubs, keeps up a small army of correspondence, reads everything he can get his hands on, and thinks about the future. If the highway picture is bad, he says, that's because it's a picture of the present and the past. The future will be better for highways when engineers and taxpayers consider roads as thoroughly as Bright has, and come up with some of his answers.

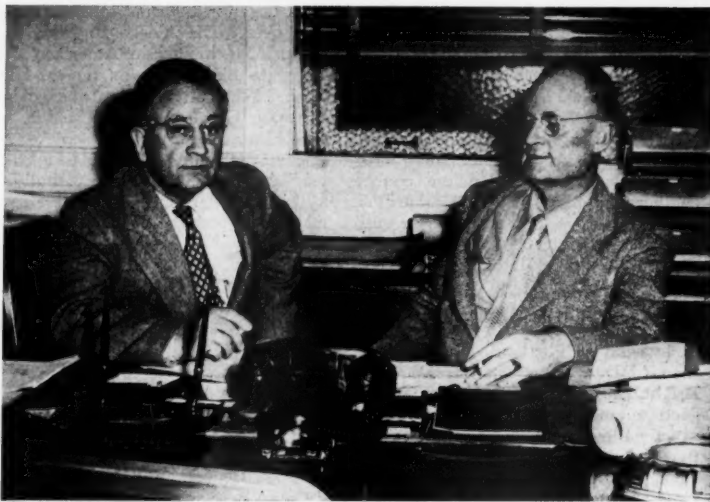
Bright's home, on 8th Street in San Bernardino, is a beautiful place to retire. The sun is warm, the days are now relatively carefree, and Bright's two grandchildren live not too far away. And although "Mr. Maintenance" has retired from active participation in highway affairs, his thinking is still as active along those lines as ever. **CONTRACTORS AND ENGINEERS MONTHLY** joins Bright's many friends throughout the nation in wishing him every success and happiness.

Hose Clamps and Fittings

A new 12-page catalog on hose clamps, tools, and fittings has been prepared by Punch-Lok Co., 321 N. Justine St., Chicago 7, Ill. This detailed literature describes the Punch-Lok method and applications, and lists the standard clamps and tools, and special fittings available.

It points out that Punch-Lok clamps serve for almost any type of hose used in the construction industry. Available stock ranges in size from 13/16 inch up to 48 inches. The catalog describes and pictures the tools which facilitate the use of Punch-Lok clamps.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 721.



W. T. Holcomb, at left, and Huston D. Mills continue to confer on Nevada highway problems, although a recent change in the Nevada administration has reversed their titles. Mr. Mills is now State Highway Engineer and Mr. Holcomb, Assistant Highway Engineer. They have worked together in the department for about thirty years.

Mills, Holcomb Change Places in Nevada Dept.

Huston D. Mills' appointment as State Highway Engineer in the Nevada Department of Highways will not disrupt his long association with W. T. Holcomb whom he replaces. Mr. Holcomb will remain in the Department as Assistant Highway Engineer. The two men first met in 1918 when they attended the same engineer officers training camp, and have worked together in the Highway Department for about thirty years.

The position of State Highway Engineer is a political office, and Mr. Mills' appointment comes as a result of the general political change in the administration of the state following the election in November, 1950. In accepting the position Mills stated that he had not applied for it and that he did not anticipate any change in personnel.

At an informal gathering which marked the changeover, Mr. Holcomb told department employees he was sure that "no one acquainted with Mr. Mills has any doubt of his being exceptionally well qualified to act as State Engineer for Nevada. His experience with the Department dates back 29 years, two-thirds of which was spent as Assistant State Highway Engineer, following several years as Right-of-Way Engineer and Office Engineer.

Throughout the state he has made friends and acquaintances among road users and others interested in good roads. It is with a great deal of pleasure that I hand over to him the privileges and responsibilities of the position of State Highway Engineer."

Portable Power Tools

A 4-page catalog on portable power tools for industrial use has been prepared by Cummins Portable Tools, Division of Cummins-Chicago Corp., 4740 N. Ravenswood Ave., Chicago 40, Ill.

Included in the line are heavy-duty drills, 1/4 and 3/8-inch models; standard-duty drills, 5/16 and 3/4-inch; and a 1/2-inch model. Other products in the line are saws, saw blades, 7 and 9-inch disk sanders, abrasive wheels, grinding wheels, wire brushes, backing pads, and a rotary planer head which mounts on the sander spindle.

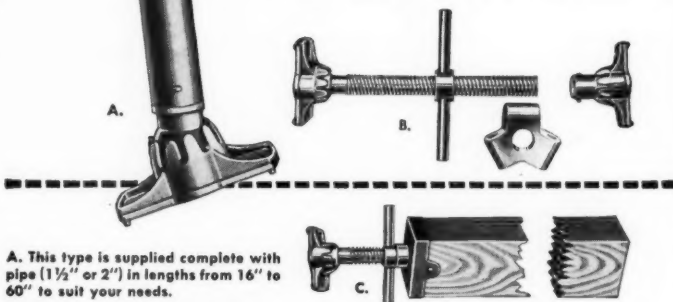
This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 731.

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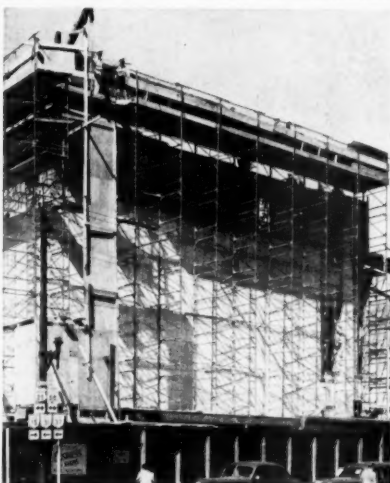
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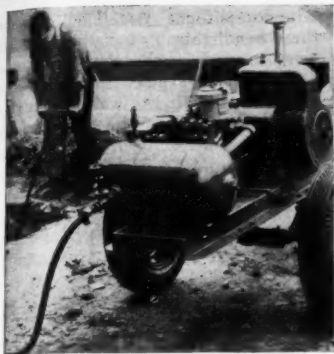


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The new Blue Brute 2-stage compressor has a capacity of 30 cfm at 100-pound pressure; maximum operating pressure is 150 pounds.

Portable Compressor With 30-CFM Capacity

A new 2-stage air-cooled portable air compressor with a capacity of 30 cfm and an operating pressure of 100 pounds has been developed by Worthington Pump & Machinery Corp., Harrison, N. J. It has an ASME air receiver, oil-bath air cleaners, and a protective V-belt guard. It is available as a trailer model 74½ inches long overall, or as a hand truck model 65 inches long.

Its features include circumferential cooling fins; tube and fin-type air-cooled intercooler; positive by-pass unloader which holds the inlet valve open during the idling period; a Worthington feather valve; separate close-grained cast-iron honed cylinders; full-floating wrist pins; oil dipper for controlled lubrication; and aluminum low-pressure piston and cast-iron high-pressure piston of equal weight for proper balance.

Further information may be secured from the company by requesting Bulletin H-850-B72. Or use the Request Card at page 16. Circle No. 808.

Wire-Rope Block Catalog

The new 24-page block catalog issued by Johnson Block Co., P.O. Box 1432, Tulsa, Okla., highlights a newly developed gin-pole top assembly to increase hoisting and loading efficiency in truck operations. The Johnson gin-pole assembly in combination with Johnson blocks and tail-board adapters is said to be a solution to many trucking block problems. These units are available to meet required capacities. Illustrations, features, and specifications are completely outlined in the catalog.

Also presented is a full line of snatch blocks, trucking blocks, construction blocks, safety hooks, hoist hooks, shackles, sheaves, and pipeline blocks. Each is illustrated and described. A table of load-increase factors for various working angles is provided. This indicates the actual stress on blocks in

relation to the working loads.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 812.

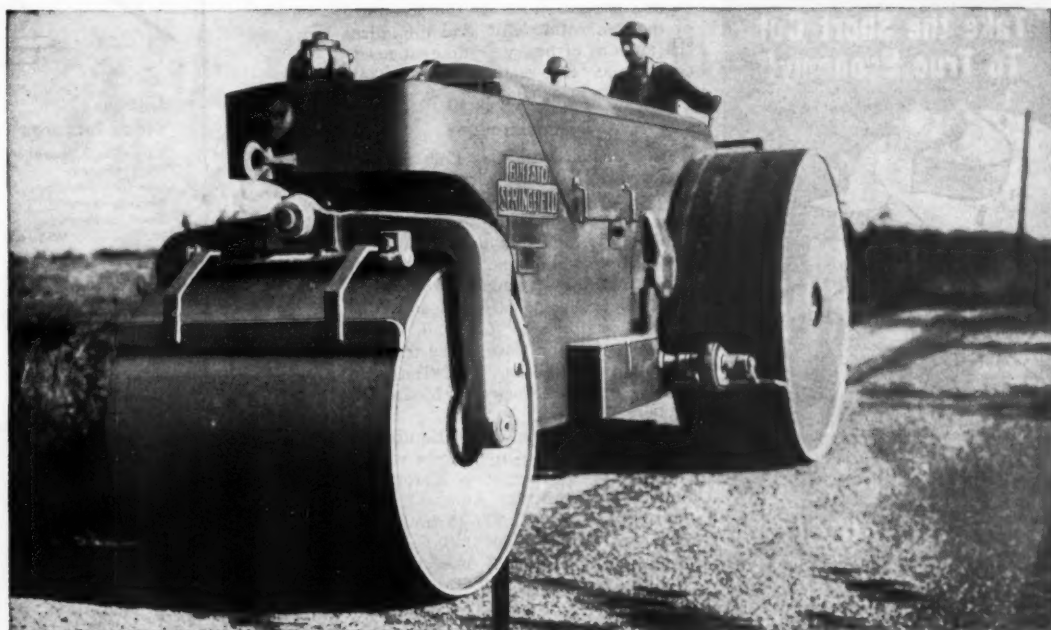
Open Steel Flooring

A new catalog describing various types of open steel flooring and armoring is available from the Machinery Division of Dravo Corp., Fifth and Liberty Aves., Pittsburgh 22, Pa., national distributor for the Tri-Lok Co. Catalog No. 1103 discusses the different types of Tri-Lok open steel flooring and safety treads. It contains specification data and safe-load tables, describes installation methods, and includes other pertinent information. It points out that T-Tri-Lok flooring, when filled with concrete, may be used instead of heavy concrete flooring to reduce dead load and thus permit a lighter-weight superstructure.

This literature may be obtained from the company, or by using Request Card at page 16. Circle No. 710.



P. & J. Artukovich of Los Angeles, Calif., uses this Lorain Moto-Crane to place 84-inch sewer pipe on the Compton Creek Sewage Project in Los Angeles.



WORKHORSE 3-Wheel Roller Style

Buffalo-Springfield variable weight 3-wheel rollers are work-horses by any definition. No longer single-purpose machines, these new units far outstrip "old Dobbin" in ability to perform many different jobs with efficiency and economy.

For example, the Buffalo-Springfield model VM-18 is basically a 5-ton machine—but that's not all. It can perform work calling for a 6-ton or even a 7-ton machine. The VM-18's wide job versatility is made possible by ballast type rolls. Heavy steel head plates, welded to the roll tires and hubs, form water-tight compartments. Filling and drain plugs in the outer heads permit filling the rolls with water

to increase the roller weight. If even higher compressions are desired, shovel openings with bolted water-tight covers are provided so a mixture of water and sand can be used as the ballasting material. Thus—the VM-18 can be adapted to meet compression requirements that would normally call for three fixed capacity models.

Equally important, the roll surfaces are machine-finished for uniform smoothness and curvature, which means the VM-18 can also be used for finishing work. Thus, one variable weight 3-wheel roller is used for many applications and reduces the equipment requirements on any road building job.

There are seven Buffalo-Springfield variable weight models covering a range from 5 to 17 tons. Your nearest distributor can give you complete details on the model best suited to your needs. See him today.

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Are You Set to Work At Night If Needed?

Illuminating Work Plane by Lights on Equipment Instead of Area Lighting Suggested by Engineer Corps Study

• BECAUSE wars are fought with more than weapons, the U. S. Army Corps of Engineers has made a study of lighting systems for construction equipment to permit round-the-clock operations. With stepped-up construction schedules in prospect to complete urgently needed defense projects, the Engineers' findings—only recently published—should prove helpful to contractors waging a battle against time.

From the study of various types of lighting, and from demonstrations with machines equipped with those lighting

systems, it was concluded that night-work lights installed on construction equipment have definite advantages over job-area floodlighting; and that optimum lighting is obtained by a combination of the two. Among these advantages are high-intensity illumination on the work plane, elimination of shadows on the work area as viewed from the operator's position, ability to adjust the lighting fixtures as needed, and the provision of lighting as an integral part of the piece of equipment. The latter—particularly important to Engineer units—permits a machine to be operated independently of the general illumination of the work area, prevents a general shutdown due to failure of the generating unit, and minimizes the amount of heavy equipment needed, such as large engine generator sets and floodlight towers.

Demonstrations

At a demonstration at Fort Belvoir, Va., a variety of construction machines equipped with night-work lighting systems were put through their paces. The machines included a Buckeye Model 70 crane, Caterpillar and Galion motor graders, Buffalo-Springfield and Galion Chief road rollers, a LeTourneau scraper with a Model LP Carryall, Caterpillar crawler and Case wheel tractors, a Rosco distributor, a LeTourneau crane and a Barber-Greene Model 44C ditcher.

Later the Marine Corps Equipment Board ran day-and-night tests with a Caterpillar D8 tractor, a Caterpillar Model 12 grader, an Adams grader, and an International TD-18 tractor. A road was cut through hilly wooded terrain without the aid of area floodlighting.

Reports from the officer in charge of the tests indicated that:

1. Night work of the same quality as day work can be done with tractors and graders at 85 per cent of the day rate.
2. No parts of the lighting systems were damaged during clearing operations.
3. The vibration of the equipment apparently had no effect on lamps or batteries, as only one lamp failed and the batteries were undamaged.
4. Equipment operators experienced no detrimental glare from the lights of other machines operating in the area.
5. Operators felt they could work with equal facility, day or night.

Types of Lighting Used

In general, the lighting fixture used was of the automotive headlight type, light in weight and capable of using 6 and 12-volt lamps in sizes from 32 to 100 cp. Three lenses developed by the Guide Lamp Division of General Motors provided light distribution for spot lighting, headlighting, or floodlighting.

The floodlighting systems for power excavators employed one rugged, commercial, adjustable 200-watt floodlight on the cab roof of ½-yard and smaller excavators; two such roof-mounted floodlights for ¾-yard and larger units; and two specially designed 100-watt floodlights mounted on the cab skirt of all machines. Two 50-watt lamps illuminated the cab interior, and a 50-watt trouble light with 25 feet of cable was provided. Gasoline-engine-driven 115-volt single-phase 60-cycle ac generators were the source of power. All wiring connections were made within wa-

terproof conduit bodies. Three switches controlled the lighting circuits: one for the roof-mounted floodlights, one for the skirt-mounted floodlights, and one for the lamps inside the cab. Two outlets for plug-in trouble lights were provided in each cab.

Lights for the motor graders includ-

ed one spotlight, two floodlights, and three headlights. Two of the headlights were located on the slanting forepart of the grader frame; the third—used for a back-up light—was mounted on the grader frame at the left rear. Two floodlights, one on each side and about

(Continued on next page)

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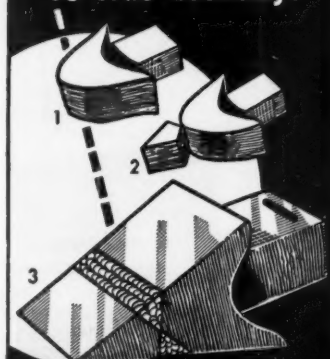
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3 inches above the panel board at the operator's compartment, illuminated the work plane, the rear and edges of the moldboard, and the forward two wheels of the grader. These two floodlights, which normally directed the higher-intensity 20 x 80-degree areas of their beams parallel to the grader frame, were adjustable for the various cutting positions of the moldboard (for grading, ditch cutting, or bank cutting), and to suit the desires of each operator. An adjustable spotlight was provided above the right floodlight. The headlights, backup light, and floodlights had separate circuits, each with its own switch.

The Buffalo-Springfield Model KT-16 and KX-16 road rollers had two headlights and four floodlights. The headlights, one on the front and one on the rear, provided illumination for movement in either direction. One adjustable floodlight, with the lens arranged to direct its higher-intensity rectangular area parallel to the roller, was mounted on each side, slightly forward of the vertical center line of the front roll. The other two floodlights were similarly mounted on the frame of the center line and above the rear roll, or above the middle roll on the three-roll model. These lights were also directed parallel to the roller and illuminated the direction forward of movement, the ground, and the edge of the roll so that the operator could judge proper overlap of successive rolls.

LeTourneau scrapers are equipped by the manufacturer with headlights and a light on the scraper yoke. The latter was replaced with a 100-cp floodlight which could be directed transversely to the long axis of the unit.

Seven tractors were included in the lighting study. The crawler tractors—Caterpillar D4, D6, D7, and D8's—were equipped with the same night-work lighting system. A fixed floodlight was mounted on the rear of the right and the left fender with the higher-intensity rectangular light areas directed transversely to the tractor, to illuminate towed equipment. One adjustable floodlight was mounted on each side of the engine cowling just forward of the instrument panel, with the light directed parallel to the tractor and its center aimed at the edge of the bulldozer blade. This was to illuminate both the blade and the adjacent ground. All three of these floodlights could be directed to either the side or the rear of the tractor. On the A-frame were one floodlight and one headlight, so mounted that the A-frame could provide maximum protection to the lights. This floodlight illuminated the ground immediately in front of the tractor; the headlight was for distance viewing. Each tractor was equipped with an outlet to plug in a trouble light.

On the Case wheel tractors a spotlight and three floodlights were used. The spotlight, on a column above the instrument panel, was adjustable to provide high-intensity light where needed. One floodlight under the operator's seat illuminated towed equipment. Two adjustable floodlights mounted on brackets, one on each side, lighted the work plane and front attachments.

Lighting the work of a distributor requires that the truck driver be able

to see not only ahead by means of headlights but, through a rear-view mirror, the action of the spraybar at the rear. Therefore three adjustable floodlights were mounted at the rear of the distributor, to provide high-intensity lighting on the spray bar and adjacent ground.

Illumination for a tractor-mounted LeTourneau M20 crane was provided by two floodlights on the fenders of the tractor, and an additional floodlight fastened to the gusset plate high on the crane. This floodlight was powered by the generator of the tractor through a cable which plugged into a socket installed on the tractor.

The four spotlights on a Barber-Greene ditching machine were replaced with adjustable floodlights and an adjustable spotlight mounted on the platform support rail where it could be reached by the operator. Two floodlights illuminated the grade stakes and ground in the direction of the machine's travel; the other two floodlights

(Concluded on next page, Col. 2)

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Blaw-Knox has a new Lite-Weight Hi-Boy Trukmixer. The 3-cubic-yard model is one ton lighter; the 4½-yard model, ½ ton lighter.

Reduces Tare Weight Of New Truck Mixers

A new model Lite-Weight Hi-Boy Trukmixer has been announced by the Blaw-Knox Division, Blaw-Knox Co., P. O. Box 1198, Pittsburgh, Pa. The weight of the 3-cubic-yard model has been reduced by 1 ton and the 4½-yard model by ½ ton.

New features of the Hi-Boy, said to eliminate excess weight and improve performance, are a 3-way non-by-passing piston-type water valve designed to simplify the piping system; a double-strand roller chain shaft; and a compact and simplified transmission.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 828.

A Plastic Compound For Sewer Jointing

A new hot-melt type of plastic pipe-jointing compound, said to have superior adhesion to both wet and dry vitrified-clay pipe, has been developed by The Atlas Mineral Products Co., 42 Walnut St., Mertzown, Pa., Atlas G-K 58 is designed to fill the requirements for a root-resistant compound free from coal tar or other objectionable phenolic bodies, for use where original G-K is not completely satisfactory because of abnormally high service temperatures. This product is said to exhibit the correct balance between hardness, flexibility, adhesion, and ability to flow at high temperatures. It will, the company says, prevent root penetration as well as infiltration and exfiltration on all sewer pipelines.

Further information can be secured from the company. Or use the Request Card at page 16. Circle No. 813.

Are You Set to Work At Night If Needed?

(Continued from preceding page)

lighted the buckets, the ditch, and the surrounding ground.

Conclusions

This description of lighting some of the many machines used in construction serves to illustrate the theory of work-plane vs. area illumination. Full details of the Corps of Engineers study are given in Report 980, First Interim Report on Night-Work Lighting Systems for Construction Equipment, submitted to The Engineer Board, Fort Belvoir, Va., and the Chief of Engineers, U. S. Army, by Charles F. Cashell, Engineer, Deputy Director, Technical Division II, The Engineer Board. Copies are available from the Office of Technical Services, Department of Commerce, Washington 25, D. C. (Price \$3.75.)

Contractors facing the problem of intensified construction activity may find in these studies help in lighting night operations. Each project presents its own peculiar problems, and the Engineers' report points out that it only covers studies made of the subject; it does not offer any conclusions. However, the studies should suggest to contractors new and possibly better means of lighting night work—particularly in a combination of area and work-plane illumination for greater efficiency and safety—in order that construction may continue on a round-the-clock basis.

Data on Centrifugal Pump: Installation and Operation

A new instruction bulletin on the installation and operation of Lawrence centrifugal pumps has been prepared by Lawrence Machine & Pump Corp., 371 Market St., Lawrence, Mass. It briefly covers the general principles which must be followed in order to insure satisfactory operation of these units. Pointing out that Lawrence pumps are built in a wide variety of designs and for many kinds of service, the bulletin explains that discussion is necessarily limited to standard horizontal pumps handling cold clear waters and operating approximately at sea level.

Topics include pump location and installation, piping, priming, packing box

and packing, lubrication, starting, stopping, and common difficulties and interruptions that may occur in service. Additional useful hydraulic data are contained in the folder.

This literature may be obtained from the company by requesting Bulletin 250, or by using the Request Card at page 16. Circle No. 771.

Joins Mir-O-Col Alloy Co.

Robert R. Applegate has joined the engineering staff of Mir-O-Col Alloy Co., Los Angeles, as Metallurgical Engineer. He has been associated with the welding industry since 1920. Mir-O-Col manufactures hard-facing alloys, automatic wire, and special alloy castings.

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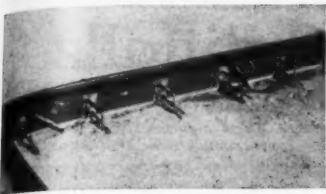
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Rodemetal transverse-joint supports consist of two bent bars and two form plates. The bars are bent to place one end in the upper portion of one slab and the other end in the lower portion of the adjacent slab. The vertical offset or suspension member falls in the center of the expansion-joint recess.

Load-Transfer Unit For Transverse Joint

A new transverse-joint support has been developed by Rodemetal Products Co., Clary Bldg., Seneca Falls, N. Y. These units, of which several are used to make up a complete joint, are composed of two bent bars. To these are added two form plates, which shape the slight depressions in the ends of the slab and assist in the assembly of the unit to the joint filler. The bars are bent to place one end in the upper portion of one slab and the other end in the lower portion of the adjacent slab. The vertical offset or suspension member falls in the center of the expansion-joint recess. A chair or support to the subgrade is provided for correct location of the bar in the slab.

When the units are assembled, the bars are placed in alternate positions, a slab having one bar in its upper section and another bar in its lower section. The bars are held rigidly in place with respect to one another and to the joint recess, by the form plates. The unit when assembled to the joint filler plumbs the filler and holds the complete joint in alignment. It borrows from the design of a bridge, by suspending the loads exerted upon the bottom of one slab from the top of the adjacent slab. The ends of these suspension members are bonded in the two slabs to provide a continuous load transference across the joint. By allowing for a slight tipping of the vertical or suspension members, the support also helps relieve expansion and contraction stresses.

In function, when a slab is loaded, the bars transfer the load through their vertical sections to the adjacent slab. The lower bar creates a tension stress in its vertical offset, while the upper bar transfers its load through the compression set up in its vertical section. Straight-line load distribution is attained through this positive structural connection.

Expansion and contraction of the blocks causes the vertical members to tip slightly. The form plates shape depressions in the slab ends of sufficient depth, allowing a factor of safety even under severe expansion of the blocks, the manufacturer states. Movement of the units is contained within the expansion-joint recess and, according to Rodemetal, eliminates the necessity for accurate location with regard to the axis of the pavement.

Further information can be secured from the company. Or use the Request Card at page 16. Circle No. 804.

Multipurpose Machine Tool

The design and the applications of the Master lathe converter are detailed in a new 18-page catalog prepared by Master Mfg. Co., 1300 E. Ave. A, Hutchinson, Kans. The converter is a portable, multipurpose, motorized, metal-working machine, with interchangeable heads or spindles for all types of machine-shop operation.

The basic miller provides the power and is of 4-post construction with a precision feed screw for positioning the spindle. It has 12 spindle speeds, 50 to 500 rpm, utilized for heavy-duty mill-

ing, boring, drilling, reaming, etc. Seven types of precision heads—universal in angular adjustment—are interchanged on the basic miller. The catalog points out that these heads have speeds from 50 to 15,000 rpm. It explains what each of the units will do, with illustrations and accompanying text. New features are highlighted and full specifications provided.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 819.

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Dravo Corp. and its subsidiaries had the best safety record in their history last year. Company employees worked 155,000 man-hours per lost-time injury—an improvement of 40 per cent over 1949. The accident-severity rate, too, was lower than in previous years. On several of The Contracting Division's big projects, including the Morgantown Lock and Dam on the Monongahela River, not a single lost-time accident occurred last year.

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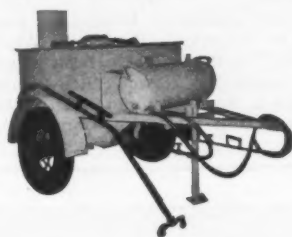
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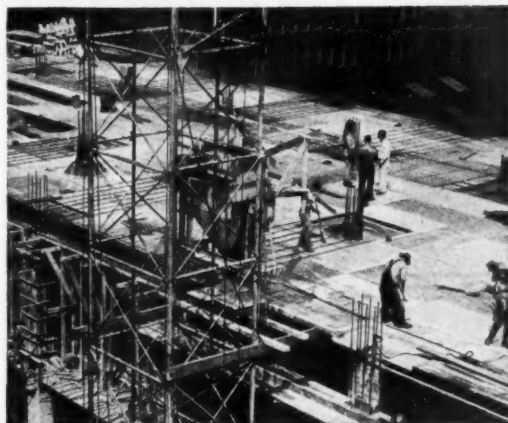
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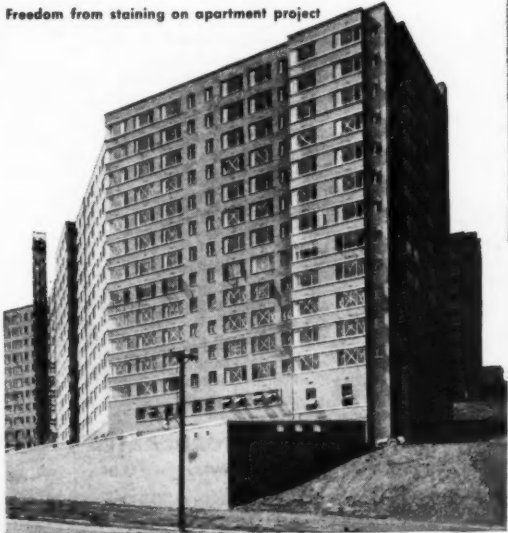


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Douglas-Fir-Plywood Data

A new booklet on Douglas fir plywood — "America's Busiest Building Material" is the title—has been issued by Douglas Fir Plywood Association, Tacoma 2, Wash. Topics treated in the folder include the features and prop-

erties of plywood, types and grades, floor construction, roof and wall sheathing, siding, data on finishing, and the use of plywood for concrete forms.

This literature may be obtained from the Association, or by using the Request Card at page 16. Circle No. 715.

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Avoid Legal Pitfalls

Edited by A. L. H. STREET, Attorney-at-Law

These brief abstracts of court decisions may aid you. Local ordinances or state laws may alter conditions in your community. If in doubt consult your own attorney.

Contracts Induced by Misrepresenting Work

THE PROBLEM: Representatives of a state highway department misrepresented the yardage of rock to be removed on a highway job. Did the misrepresentations have to be fraudulent to justify the contractor in quitting and in demanding the reasonable value of work done?

THE ANSWER: No. (State v. Hartford Accident & Indemnity Co., 70 Atl. 2d 109, decided by the Connecticut Supreme Court of Errors.)

The court said that it was enough to show that substantial misrepresentations were made and that, relying upon them, the contractor took the job. However, the contractor's right to complain was diminished by the facts that the bidding specifications required him to examine the plans and site, and that, although the plans showed rock, no examination of the site was made before bidding.

But, ordering a new trial because the trial judge's findings were not clear, the Supreme Court declared that if it was misrepresented to the contractor that there were no more than 38,000 cubic yards of rock to be removed when there were more than 69,000 cubic yards, the contractor had a right to cancel the contract within a reasonable time after discovering the true state of affairs, and collect for work done. It made no difference that the contract fixed a unit price for "unclassified excavation".

Rights of Abutters in Roads

THE PROBLEM: All courts seem to agree that even if a state, county, or municipality has a mere easement over land for public-road purposes, the rights of abutting landowners are not violated by the felling of trees or use of the soil as an incident to road improvements. But was a public-utility corporation liable to an abutter for trees cut by a contractor in constructing an electric line for the company in a road, the soil of which belonged

to the abutter, subject to an easement for public travel and an easement which might have permitted trimming of the trees in constructing the electric line?

THE ANSWER: Yes. (Mall v. C. & W. Rural Electric Co-Operative Assn., 213 Pac. 2d 993, decided by the Kansas Supreme Court.)

The contractor was not made a party to the suit, and the electric company defended on the ground that it was not liable for the contractor's act in felling the trees. The Supreme Court replied that the company could not escape liability for the wrongful cutting which was necessarily involved in performing

(Continued on next page)

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Avoid Legal Pitfalls

(Continued from preceding page)

the contract. (Courts seem generally to agree that both owner and contractor are liable for trespass upon the rights of third parties which is involved in the performance of a contract. So it behooves the contractor to assure himself that the owner has such title to the site as to permit lawful performance of the job, or to exact from the owner an agreement to indemnify him against liability.)

The Supreme Court recognized that the highway authorities could have destroyed the trees if necessary in widening the traveled way, or in constructing drainage ditches. The court also recognized that the electric company had a right to construct its line in the road. But, said the court, this right of a public utility does not permit it to damage, take, or destroy private property located within the right-of-way and belonging to the abutter without paying him damages.

Accordingly, the court decided that defendant company had rendered itself liable under a Kansas statute providing a penalty of treble damages for wrongfully cutting trees standing on the land of another. The company's attorneys unsuccessfully argued that even though an abutter may own the bed of a road, subject to the public right of travel, etc., a tree in the road cannot be said to stand on his land.

Shovel Rent Exceeds OPA

THE PROBLEM: The rental agreed upon in the leasing of a power shovel innocently violated an OPA ceiling regulation. (1) Did that so invalidate the lease that no rental could be recovered? (2) If rental was recoverable was allowance of an \$1,800 attorney's fee proper under a clause providing for allowance of a reasonable attorney's fee if payment of the rental were enforced by suit?

THE ANSWERS: (1) No, the lessor was entitled to collect the ceiling rate, forfeiting the excess agreed upon. (2) Yes, considering the fact that the total rental allowed by the court was \$12,592.50.

THE ANSWER TO THE ENGINEER'S PRAYER

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(Thomas v. Linder, 231 S. W. 2d 891, decided by the Texas Court of Civil Appeals.)

Defendant Breaks Agreement To Award a Job Subcontract

THE PROBLEM: Defendants were awarded a construction job, after they had agreed that if plaintiff would submit figures on part of the job he would get a subcontract for that part. Before the prime contract was made, the owner objected to plaintiff as a subcontractor and defendants sublet the work to a third party. Did defendants have a good defense against plaintiff's suit for damages for failing to give plaintiff the subcontract, on a theory that it was impossible to do so?

THE ANSWER: No. (Fast, Inc. v. Shaner, 183 Fed. 2d 504, decided by the United States Court of Appeals, Third Circuit.)

The court said that the defense was invalid for these reasons: (1) No effort was made by defendants to try to

talk the owner into withdrawing his objection to plaintiff. (2) Defendants, having bound themselves to give plaintiff a subcontract if they got the prime contract, could not escape liability for not doing so by throwing plaintiff overboard.

Third Parties' Right to Sue on Insurance Clause

THE PROBLEM: A prime contractor agreed to carry liability insurance for the benefit of the owner and its employees, and to require subcontractors to carry liability insurance. An employee of the owner was injured through negligent driving of a subcontractor's truck. The subcontractor carried no insurance. The injured employee was partly compensated for his injury by workmen's compensation insurance. Did he and the owner's compensation insurer have a right to sue the prime contractor for their respective losses resulting from the contractor's failure to require the subcontractor

to carry liability insurance?

THE ANSWER: Yes. (James Stewart & Co. v. Law, 233 S. W. 2d 558, decided by the Texas Supreme Court.)

The court said that the mere fact that the contract requirement for carrying insurance was primarily intended to protect the owner and the contractor did not make it any the less secondarily for the benefit of such third parties as a subcontractor's employee and the owner's insurer.

City Was Held Not Liable For Engineer's Service Fee

THE PROBLEM: An engineer prepared plans and specifications for a municipal sewer project in Oklahoma; it was contemplated that his fee would be paid out of the proceeds of sewer bonds to be issued. The bonds were officially approved and prepared but were never delivered although sold, because the sewer project was abandoned. Was the city liable to the engineer for his fee,

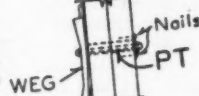
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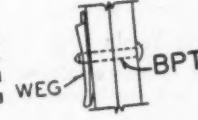
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RICHMOND KNOW-HOW—DEPENDABILITY—SERVICE—ESTIMATES & JOB PLANNING

Avoid Legal Pitfalls

(Continued from preceding page)

the expense not having been provided for in the municipal budget?

THE ANSWER: No. (McMasters v. Town of Byars, 223 Pac. 2d 545, decided by the Oklahoma Supreme Court.)

The decision was grounded upon an Oklahoma statute which forbids county and municipal boards to incur debts in excess of estimates approved by an else board or in excess of the amount provided for the purpose by a bond issue. The court said that bonds are not issued within the meaning of the statute until the bonds have been sold and delivered and the municipality has received the proceeds.

Subcontractor Was Not Bound by a Settlement

THE PROBLEM: In an adjustment of mutual claims between a contractor and a subcontractor, was the former entitled to deduct from the subcontract price an amount that he allowed the owner as damages for defective work done by the sub?

THE ANSWER: No. (Williard Sales & Service, Inc. v. Stevens, 76 Atl. 2d 225, decided by the Pennsylvania Superior Court.)

The court fully recognized that the contractor was entitled to such damages as he may have suffered from the subcontractor's failure to do his work properly. But the mere fact that the owner and the prime contractor agreed on the amount of the damages to be allowed was not binding on the subcontractor, because he was not a party to the settlement.

Employee Steals Tools

THE PROBLEM: A former employee was driving away in a truck from a tool house with tools belonging to the employer when caught in the act. Was he guilty of larceny?

THE ANSWER: Yes. (Winegar v. State, 222 Pac. 2d 170, decided by the Oklahoma Criminal Court of Appeals.)

The court noted that theft is complete

as soon as the stolen property is under the control of the thief with intent to carry it away and it has been carried the "least distance", although his possession is immediately interrupted.

Workmen's Compensation For Horse-Play Accident

THE PROBLEM: In unloading construction materials from a truck, one employee pulled another from it and the latter was injured. Was the injured man entitled to a workman's compensation award?

THE ANSWER: Yes. (Allsep v. Daniel Construction Co., 57 S. E. 2d 427, decided by the South Carolina Supreme Court.)

The court held that it was illogical to say that the injury was not related to the employment. It is commonly known that congregated workmen are predisposed to pranks that frequently result in injury. For these injuries the injured men should be compensated; this conforms to the purpose of the workmen's compensation law to transfer part of the financial burden of disability to the employer, who, in exchange, is relieved of the burden of damage suits.

Watch Contract Signatures!

THE PROBLEM: A contract was signed, as to owner, "Central Coal Co. by E. J. Davis, President." Could Davis be held personally liable on the contract, even if, as claimed by the contractor, he was virtually the corporation?

THE ANSWER: No. (Anderson v. Davis, 234 S. W. 2d 368, decided by the Tennessee Court of Appeals, Middle Section.)

The decision was influenced by the fact that the contractor's attorney drew the contract, which recited in the opening paragraph that it was "between Central Coal Co., E. J. Davis, President" and the contractor. The court applied the general rule of law that where the intention of contracting parties is doubtful because of the wording used, the agreement will be interpreted against the party who drafted the contract.

The opinion emphasizes the need for caution in signing, or accepting signatures, which do not clearly show whether or not the signer acts merely in a representative capacity and does not intend to bind himself individually.

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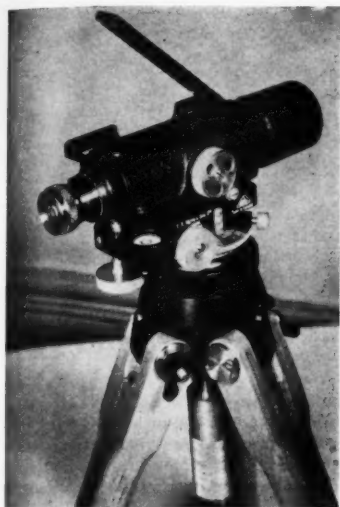
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Anyone can operate the Quickset level, its manufacturer says. It features a tilting telescope and ball joint for rapid setup, and weighs 4 pounds.

Quick-Setting Level

A new general-purpose level, simple and easy to use, has been announced by Jarrell-Ash Co., 165 Newbury St., Boston 16, Mass., American distributor for the line manufactured by Hilger & Watts Ltd., London. The new Quickset level can, it is claimed, be operated by any intelligent person, without technical knowledge, to an accuracy of $\frac{1}{8}$ inch in 300 feet.

Its principal feature is a tilting telescope and ball joint for rapid setting up, instead of a 3-screw base. By means of this ball joint, used in conjunction with the circular bubble under the eyepiece of the level, the instrument is roughly leveled. Final adjustment is made with the slow-motion screw until the main bubble is truly horizontal. There is no possibility of error, the company explains, since the bubble can be viewed at the same moment that the staff is read.

The manufacturer points out that the main bubble must be brought to the center of its run for each shot; yet this operation is so speedily carried out that much time is saved in comparison with other methods. Another feature is that the accuracy of the level depends solely upon the relation of the bubble to the telescope and not on the true verticality of the center; nor is it affected by wear in this part of the instrument.

The telescope has internal focusing, a screw-focusing eyepiece, and a glass stadia diaphragm. Staff readings of 0.01 foot (or $\frac{1}{8}$ inch) can be made at 300-foot distances. The Quickset level is available complete with leather case and tripod. The instrument weighs 4 pounds.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 820.

Proposed Expressway Section

Engineers attending the Houston Winter Convention of the American Society of Civil Engineers got a briefing on the proposed Houston Urban Expressway by W. J. Van London, Engineer-Manager, Houston Urban Expressways, for the Texas Highway Department. The 6-mile section now being considered, he said, would cost \$5,000,000 a mile; entrance and exit ramps would cost an additional \$3,500,000 a mile. There are 62 railroad tracks and 26 streets that must be left open to traffic. The average distance between major street and railroad crossings is 700 feet. Since there are 9 stream crossings in the area, a depressed expressway is out of the question. A double-deck elevated expressway with one-way traffic on each level is being considered.

Mr. Van London also debunked a few popular misconceptions of urban ex-

pressways. They are not primarily designed for traffic passing through cities; only 6 per cent of the traffic using expressways in Houston would be through highway traffic. Nor are they dreamways for joy riders; traffic counts on the Gulf Freeway show that the largest traffic is on Thursday and Friday, the lowest on weekends and holidays.

Catalog on Traffic Signs

A 16-page catalog on traffic signs made with Scotchlite reflective sheeting is available from the Minnesota Mining & Mfg. Co., St. Paul 6, Minn. Features of the signs, sign specifications, and available legends are described in the booklet. Scotchlite signs come in all standard shapes with regulatory, warning, and miscellaneous legends. All standard highway sizes are available. Also included is information on barricade strips and reflective delineators.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 725.

New M-C&S Post for Denny

William Denny, a veteran of more than 20 years with Merritt-Chapman & Scott Corp., New York, is now Assistant to Ralph E. DeSimone, Executive Vice President and General Manager of the company. In his new capacity, Denny will administer the affairs of the firm's New York Marine and Heavy Construction Division. Burton F. Sanders suc-

ceeds him as Project Manager on the Elizabeth River Tunnel between Portsmouth and Berkley, Va.

Other projects on which Denny has worked include the substructures for the Delaware Memorial Bridge at New Castle, Del.; a highway bridge across the Mississippi at Memphis, Tenn.; the 14th Street Bridge at Washington, D. C.; and the Potomac River Bridge at Morgantown, Md.

YOURS FOR THE ASKING

Further information or descriptive literature can be secured from any advertisers in this issue of **CONTRACTORS & ENGINEERS MONTHLY**. Just write name of manufacturer and product of interest to you on the extra line provided on the post card facing page 16, fill in your own name and industry connection, mail to us and we'll do the rest.

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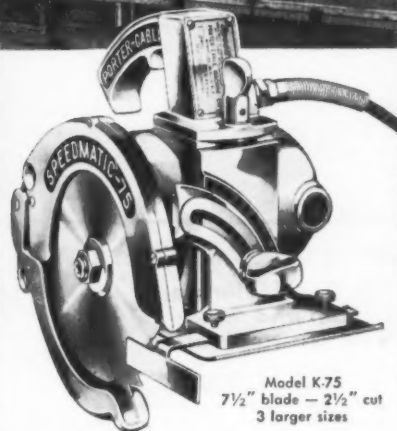


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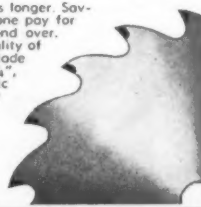
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Half-Mile "Spreads" On Grading Contract

Small, Well Organized Crew Rebuilds U. S. 14 Completely As Equipment Concentrates in Construction Section

• HALF-MILE construction sections, worked until the new highway roadbed was complete, highlighted one of Minnesota's summer projects on U. S. 14 between Balaton and Florence, in the western part of the state. The demonstration that an ordinary small job can be excellently organized was made by John S. Pukrop, road contractor of Ivanhoe, Minn.

For several years the existing highway roadbed required considerable maintenance to keep it in good repair because of frost boils and heavy traffic. The bad section, 9.6 miles long, needed major construction treatment. When the Minnesota Department of Highways planned the improvement, it did so with a view toward modernizing the section fully. Grading, salvage of old asphalt pavement and gravel, subgrade correction, and the installation of new drainage structures and cattle passes were included in the contract.

Improvement work was centered in the existing 150-foot right-of-way. The grading plans called for a 42-foot finished roadbed. Backslopes varied from 3 to 1 to 6 to 1. Shoulder slopes were 3 and 4 to 1.

Dragline Places Drains

Pukrop started the job at the Balaton, or eastern, end. Sections approximately ½ mile long were laid out for construction, and automobile traffic was detoured around secondary roads. Numerous corrugated-metal pipe drains, concrete pipes, and concrete cattle passes had to be placed before the grading could start.

Excavations for these structures were made by a small ¾-yard Koehring dragline. When the dirt was out and the cross sections checked, the machine then doubled as a crane to set the structure parts. Pneumatic equipment started the structure backfill, and when it was in the clear the grading roller took over. The dragline stayed out

ahead of the rest of the crew without great difficulty, even when it had to help muck out extensive frost-boil areas.

Fast Pavement Removal

The State wanted the old bituminous surface and the underlying granular base salvaged, so these materials could be used again later when frost-boil excavations were filled, and the roadbed covered by a new base. In each half-mile section there were about 1,000 cubic yards of bituminous road-mix material, and about 1,500 cubic yards of gravel base.

The half-mile stretch was bare in a shift. A Caterpillar No. 12 motor grader ripped the bituminous surface to pieces with its scarifier teeth. It made two more passes and bladed the broken material into a windrow. A D4-mounted Trackson loader scooped the windrow up, and dumped it to the beds of several trucks. They made a stockpile at intervals of a mile.

Ordinarily the gravel base did not require much ripping. It was loaded direct by scrapers, and stockpiled for use later on.

Grading Begins

Grading began as soon as the bituminous-surface removal was out of the way. Four D8 tractors pulled two Le-Tourneau FP Carryalls and two Caterpillar No. 80 scrapers. A DW10 Caterpillar handled a Caterpillar scraper for longer-haul work. There was a D7 dozer and a D7 push cat. A No. 12 Caterpillar motor grader was assigned to sloping and finish blading.

A D4 tractor with a double set of Le-Tourneau sheepfoot tampers came in for compaction. A 2,000-gallon water tank truck, belonging to Heggestad Construction Co., of Tyler, Minn., brought in water from nearby lakes and streams. A small truck for rock picking and a Ford rubber-tired tractor



C. & E. M. Photo

A Caterpillar No. 12 motor grader lists a bit as it dresses a side slope of U. S. 14 in Minnesota. The roadway behind is largely finished.

for dragging completed the equipment picture.

Under the personal supervision of Superintendent Martin Nelson, now deceased, the machines worked the sections against balance points. There was considerable overhaul. Generally speaking the DW10 made the longer hauls, and tractor-scraper units made

the short ones.

As the slopes began to shape up behind the grading equipment, they were dressed by the motor grader. Cut and fill slopes alike were bladed. When a section got close to grade, sloping was never very far behind.

The material, mostly clay, sand, or (Concluded on next page)



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is Greatest!



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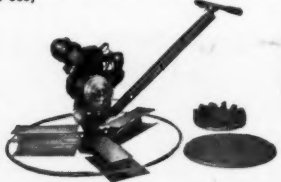
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topsoil, dug well. It had a few glacial boulders, but not enough to bother. The scrapers could dig it nicely. The material was then dumped in 8-inch lifts, watered when necessary, and rolled continuously as the lifts were brought up. Each lift got about 8 passes with the sheepfoot.

Equipment was serviced daily with fuel and grease, and minor operating repairs were made in the field. With authorized Caterpillar service close by, the few major repair jobs that developed were no particular problem, and the prompt replacement of the necessary parts soon had the equipment rolling again.

As each section was completed, scrapers dug the stockpiled gravel base out and returned it to the bladed roadway. It was then watered, spread, and rolled, and the section was ready for final cross sections.

Bituminous Surface Reclaimed

Salvage of the old bituminous surface was done by a subcontractor, Heggestad Construction Co. A mobile loading and screening unit was employed at each stockpile.

The broken material was scooped up by a Unit 1/2-yard shovel, and dumped to a 2-yard feeder hopper with 6-inch grizzly bars across the top. The Trackson loader which had scooped the material originally now worked to keep the Unit machine supplied.

From the feeder hopper, the bituminous material passed to a 35-foot Coyle & Roth conveyor, driven by a Continental engine. The same engine also drove, through a system of chains, a vibrating screen deck 4 x 8 feet, equipped with 1-inch mesh.

Throughs from this screen dropped to waiting dump trucks, and were hauled out to the highway. Lumps retained on the screen went ahead to a central stockpile near the middle of the job, where they were reduced to 1-inch minus later on by a jaw crusher.

The old bituminous material was then road-mixed, and laid down, and a light bituminous seal was placed on it by the maintenance men of the Highway Department.

Future plans call for a major concrete-paving contract. With the frost damage corrected, and new base and sight-distance standards established, it will be an important addition to Minnesota's highway system.

Landscape Crews Clear Up After 1950's Near-Hurricane

The near-hurricane in the east last November took its toll of trees in New Jersey and brought the landscape crews of the State Highway Department out in full force. They had to remove or cut back to stumps over 1,000 fallen and dangerous trees. The removal and the tree trimming is still going on.

The landscape maintenance force of the Department consists of 10 landscape foremen with 3 assistants, 25 truck drivers, and 117 laborers. These men work under the supervision of the Principal Landscape Engineer, Robert S. Green, and a senior landscape engineer. Working equipment consists of 19 rack trucks, 6 dump trucks, 23 tractor mowers, and 70 whirlwind-type power mowers. During the hurricane, a 35-foot-boom crane, a highway trailer, and many cargo trucks were pressed into service.

Each of the 10 landscape districts has its own crew. The ten crews maintain over 2,500 acres of grass in center islands, intersections, and roadsides, and over 150 acres of planting beds and individual trees. Route 4 Parkway, John Davison Rockefeller Memorial Highway, dual highways, and intersections require the most maintenance.

Personnel is short this year, so the work will be confined chiefly to maintaining the existing highways and commencing landscape maintenance on



C. & E. M. Photo

The Heggestad asphalt-reclaiming spread is shown here. Oversize lumps, too numerous to waste, will be run through a jaw crusher.

newly constructed routes and new sections of Route 4 Parkway. Highway em-

ployees may resume this year the cultivation of their own vegetable gardens,

near the new State Highway Office Building just north of Trenton. During the last war they cultivated over 60 such gardens, each 30 x 50 feet. If re-established, the gardens will probably be called "Liberty Gardens".

New U. S. Tire Warehouse

United States Rubber Co. has opened a new warehouse adjoining its Tire Division Plant in Eau Claire, Wis. Finished tires and tubes will be brought into the warehouse by a 1/2-mile conveyor from the Inspection and Finishing Department of the plant. Distribution to other floors for stocking or shipping will be by two 16,000-pound-capacity elevators. George A. Fuller Co. of New York was the general contractor.

A TYPICAL RECORD OF LAPLANT-CHOATE MOTOR SCRAPER DEPENDABILITY

**3 machines used on six big jobs
in three years... with only
ONE MAJOR OVERHAUL!**



DEWEY SPENCER, of the Spencer Construction Co., Carrollton, Texas, bought his first two TS-300 Motor Scrapers in 1948, and 6 months later added a third unit to his fleet. In three years, the two oldest units have had *only one major overhaul*, and the newest machine has had *no overhaul* to date. These LaPlant-Choate TS-300's have been used on 6 big jobs and have moved an estimated 1,500,000 yards of material.

LIKE Dewey Spencer and so many other Motor Scraper owners, you can depend on the TS-300 for the steady, slugging performance that sets a profit-making pace on job after job, day in and day out. Investigate the Motor Scraper features that assure dependability... watch them on the job... ask the men who own or operate them... see your LPC distributor for the complete story. LaPlant-Choate Manufacturing Co., Inc., Cedar Rapids, Iowa — LaPlant-Choate Sales and Service, 1022 77th Ave., Oakland, California.

LAPLANT CHOATE



Cable-operated Scrapers in 6-, 8- and 14-yd. sizes for all makes of track-type



2- and 4-yd. Scrapers for track-type and



Hydraulic and Cable-operated

Contractors Raise Association Funds by Doing Job Together

There's an organization of earth-movers in Los Angeles, called the Excavating and Grading Contractors Association, which gets together semi-monthly to exchange ideas on cost-cutting, improving working conditions, opposing unfair practices, and promoting better business relations for all members. Recently it undertook an interesting means of raising money for its treasury.

One of its members was awarded a subcontract for moving about 5,000 yards of dirt and over 100 truckloads of rubbish for the new Culver City Memorial Hospital. The member turned his contract over to the association, and the rest donated enough tractors, skid loaders, draglines, trench hoes, dump trucks, and scrapers to do the job in one day. A fleet of Allis-Chalmers HD-5G Tracto-Shovels handled the excavating and grading. Proceeds went to the association's treasury and will help further its efforts to pool knowledge and facilities.

New Gasoline Drive For Small Conveyor

New models of the Brik-Toter, a portable conveyor for raising materials from one level to another, may be obtained with gasoline-engine drive, according to a recent announcement by Mar-Rail Conveyor Co., 560 York Ave., Pawtucket, R. I. The gasoline engine is a Briggs & Stratton Model NPR-6, 4-cycle air-cooled unit with a 6 to 1 gear reduction. It is supplied with a rope starter and other standard equipment, and is mounted below the conveyor belt level to allow handling of materials wider than the 12-inch belt width. The conveyor is also still available with a 1/2-hp electric-motor drive. This unit's applications on a construction job include raising bricks, mortar, nails, roofing, and other supplies from one floor level to another.

Further information on the Brik-Toter may be secured from the company. Or use the Request Card at page 16. Circle No. 724.

Rebuilt Diesel Castings

A 4-page folder describing diesel castings rebuilt with the Guth fusion process, a specialized system of reconstructing damaged or worn castings, is available from Guth Co., McPherson, Kans. With 25 years of experience in this work, Guth is prepared to guarantee every cylinder-head block or casting reconstructed by the Guth fusion process to be equal to or better than the original factory castings, the literature says. Castings which fall short of this standard will be promptly replaced without charge.

The booklet outlines the features of the system and the finished product. Most standard makes are immediately available for exchange shipment, the company states. Special feature of this work is the extra-hard alloys for valve seats, said to give better compression with less time out for servicing. Guth also reports that transmission and differential cases for wheel or track-type tractors can be reconstructed like new, regardless of their condition.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 788.

Fruehauf Promotes Tice

A. K. Tice has been promoted to Assistant to the Vice President in Charge of Sales of the Fruehauf Trailer Co., Detroit, Mich. Prior to his promotion he was Manager of the Sacramento, Calif., branch.



A new wrinkle in fund raising: The Excavating and Grading Contractors Association, Los Angeles, did this dirt-moving job together and turned the proceeds over to their association treasury. The money will help finance the activities of the association.

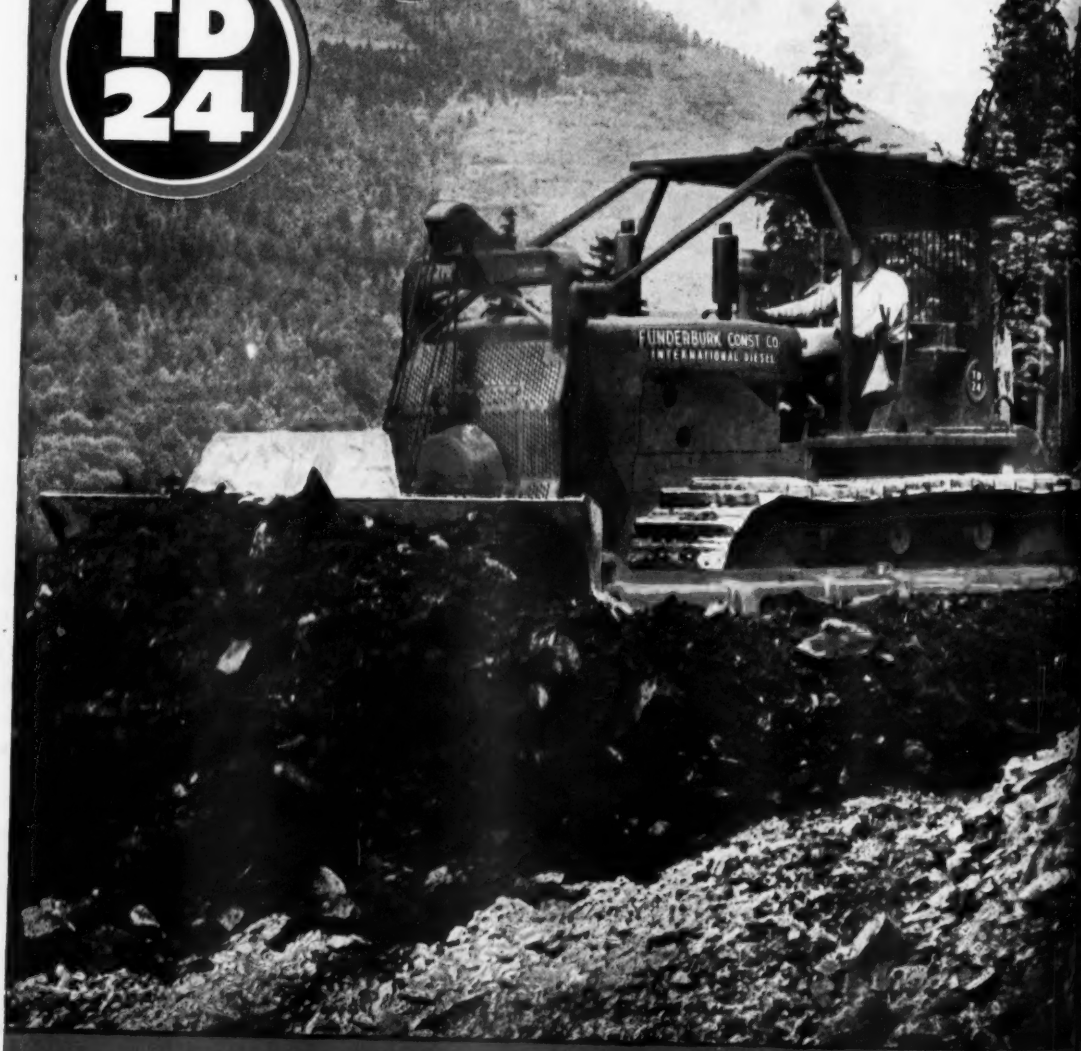
Data Card Gives Dimensions On Pipe Fittings, Flanges

A data card giving dimensions on pipe welding fittings and flanges is issued by Taylor Forge & Pipe Works, P.O. Box 485, Chicago 90, Ill. One side covers the WeldELL line of Taylor Forge welding fittings. It shows the wall thickness and the essential dimensions for all types of fittings for every nominal pipe size from 1/2 inch through 30 inches. The other side gives the essential dimensions and bolting data for all types of flanges, in all weights, for nominal pipe sizes from 1/2 inch through 24 inches.

This card may be obtained from the company, or by using the Request Card that is bound in at page 16. Circle No. 793.

"Big Red"

TD
24

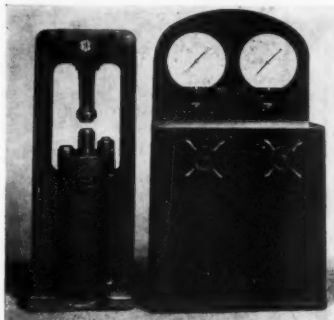


A Two-Unit Machine For Concrete Testing

Redesigned to separate the loading and weighing units, a new concrete-testing machine of 100,000-pound capacity is announced by Baldwin-Lima-Hamilton Corp., Philadelphia 42, Pa. The two-unit design prevents transmission of load shocks to the indicator and keeps the operator out of range of flying or falling particles.

The new testing machine is similar in operation to the 90,000-pound machine which it replaces. It is designed primarily for testing 2-inch cubes and 3 x 6-inch cylinders, but the stroke and dimensions permit other uses.

The loading unit has a clear space of 17½ inches between columns and a



The Baldwin 100,000-pound concrete-testing machine has been redesigned in two units to prevent transmission of load shocks to the indicator and to keep the operator out of range of breaking particles.

maximum opening of 22¼ inches between ram and upper platen. Ram travel is 3 inches at speeds up to 1¼ inches per minute. The loading rate is controlled by a pacing indicator and a manually operated valve which varies the pump discharge to the hydraulic loading cylinder. The load can be increased at a constant rate of 4,000 psi per minute on 3-inch cylinders and 2-inch cubes when operating on the 100,000-pound dial; and at 4,000 or 1,000 psi per minute on 2-inch cubes when operating on the 10,000-pound dial. Floor area required by the two units is approximately 70 x 20 inches and overall height is 65 inches.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 792.

Convention Calendar

April 24-26—Wood-Preservers' Meeting

Annual Meeting, American Wood Preservers' Association, Stevens Hotel, Chicago, Ill. H. L. Dawson, Secretary-Treasurer, 839 17th St., N. W., Washington 6, D. C.

May 10—Flood-Control Association

Annual Spring Meeting, Mississippi Valley Flood Control Association, Mayflower Hotel, Washington, D. C. R. W. Crawford, Executive Vice President, 203 Peabody Hotel, Memphis 3, Tenn.

May 14-15—Florida Road Conference

Annual Florida Highway Conference, University of Florida, Gainesville, Fla. L. J. Ritter, Associate Professor of Civil Engineering, University of Florida, Gainesville, Fla.

June 13-16—ASCE Meeting

Summer Convention, American Society of Civil Engineers, Brown Hotel, Louisville, Ky. C. W. Lovell, General Chairman, 418 Oread Road, Louisville, Ky.

October 8-14—Pan American Road Congress

Fifth Pan American Highway Congress, Lima, Peru. International Road Federation, 550 Washington Bldg., Washington 5, D. C.

Hydraulic System

Develops 1,000 PSI

A new completely packaged hydraulic system has been developed by Harco Industries, 20 Curtice St., Rochester 5, N. Y., for use in building simple hydraulic presses, jigs, clamps, or fixtures.

Solid coupling of the motor and pump is designed to eliminate drive belts; lessen repair costs or work stoppage through mechanical breakdown; and minimize pressure flutter and overheating due to maintenance of pilot pressures with large-volume installations.

More than 100 models offer ranges of 1.8 to 8.25 gpm, and pressures up to 1,000 psi. The totally enclosed motor ranges from ½ to 5 hp with manual, electro-pneumatic, or hydraulic valve control. The complete unit, which may be used as a complete hydraulic system or as a pilot system on large installations, includes motor, solid coupling, vane-type pump, reservoir, oil cooler, air filter, overload valve, pressure-regulating valve, and a 3 or a 4-way valve or a combination of both.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 732.

Booklet Answers Questions

About Regulations of NPA

If you have questions about the inventory-control and priorities regulations issued by the National Production Authority, there's a little booklet that answers general questions accurately. It's called "Inventory Control and Priorities, Answers to 85 Questions", and it is published by the NPA.

Principal materials to which inventory control applies under Regulation 1, include cement, lumber and plywood, steel, natural and synthetic rubber, and burlap. The booklet defines "inventory", tells how one is to be computed, explains what increases are allowable. It covers "earmarking", delivery, certification, imports, penalties, etc.

The section on the priorities system established by Regulation 2 tells how preference is given to defense orders, who may place "DO" orders, and how they are extended. Time limit, rejection, sequence, cancellation, delivery, sales and quotations, replacement, production equipment, and customer relations are some of the other headings under which questions are asked and answered.

To secure a copy of the booklet, address the National Production Authority, U. S. Department of Commerce, Washington 25, D. C., or the Field Office nearest to you can supply you with one.

Beats Blue Mountain

Read how the International TD-24 pays off, helping build mountain-top radio station.

Out near Seattle rise two 3,000-foot peaks that have suddenly become mighty important. Blue Mountain and Wheeler Mountain, a mile apart, are the bases for new antenna towers of what will be one of the most powerful radio stations ever built.

Toughest part of the construction job was building roads up the mountains. First the Funderburk Construction Company conquered Mt. Wheeler. Then they bought a new International TD-24 and started gouging out the rocky road to the top of Blue Mountain. And with the big red champ on the job, they moved faster, easier, more profitably.

"It's the TD-24's power and Planet Power steering that pay off," says Ed Funderburk. "The TD-24 stays up in the bank easier and

pushes bigger blade-fuls farther than any other tractor can. This means lots more material moved at the end of the day."

It means more work done on any job. See for yourself. See your International Industrial Distributor and get the real low-down on the TD-24. And check up on the service your distributor can give you over the hard-working years ahead. With factory-trained mechanics and ample shop facilities, backed up by International's strategic network of parts depots across the country, your International Industrial Distributor is all set to keep your International power on the job for you and the nation!

INTERNATIONAL HARVESTER COMPANY
CHICAGO 1, ILLINOIS

TOP THIS ONE! Building a 14-mile road to "top" Blue Mountain means dozing down 250,000 cubic yards of material—mostly rock. It's a job that calls for the brute power of the world's most powerful crawler—the International TD-24.

RECESS FOR THE CHAMP! It's child's play for Ed Funderburk's TD-24 when the skinner lays off dozing long enough to pull stumps from the new road's right-of-way.



INTERNATIONAL

POWER THAT PAYS



EXCAVATION



Heavy canal excavation was handled in part by three draglines. Here a 2-yard bucket on a Northwest dragline boom takes a big swing and cut for the man-made river.



This special sloping dozer built by Peterson Tractor & Equipment Co. came in mighty handy dressing the canal slope to rough dimensions.

Friant-Kern Canal Nearing Completion

155-Mile Man-Made River Is Rushed to Completion in Five Years as Contractor Refines Working Methods

• MAYBE the best way to tell this story would be to give it to you from Bill Miller's viewpoint. Bill has been the slip-form boss on 95 miles of Friant-Kern Canal, out in California's Central Valley Project. Bill wasn't head boss of the whole spread; he always had the "Terrible Seven" supervisors dealing out the orders from the main office . . . but so did fellows like Trimmer Boss Bill Crowder and Shop Foreman "Sailor" Hamby. But from Bill Miller's or anybody's viewpoint, you don't build 95 miles of irrigation system in 5 years without improving your methods and learning a lot about canals. That's what this is all about.

For January, 1951, saw the last con-

crete lining all done on the last mile of the Friant-Kern Canal. In the incredibly short time of 5 years, the U. S. Bureau of Reclamation and its contractors have pushed the big water lifeline 155 miles southward from Friant Dam. Of that 155 miles, Peter Kiewit Sons' Co. of Omaha has built 95 miles. The company operated so efficiently and kept improving methods so much that it was low bidder on the last 67 miles. The job just finished was a 23-mile slug, which went for \$3,333,000. It included earthwork in easy digging, concrete lining, and structures.

A Big Canal

Friant-Kern Canal was built to de-

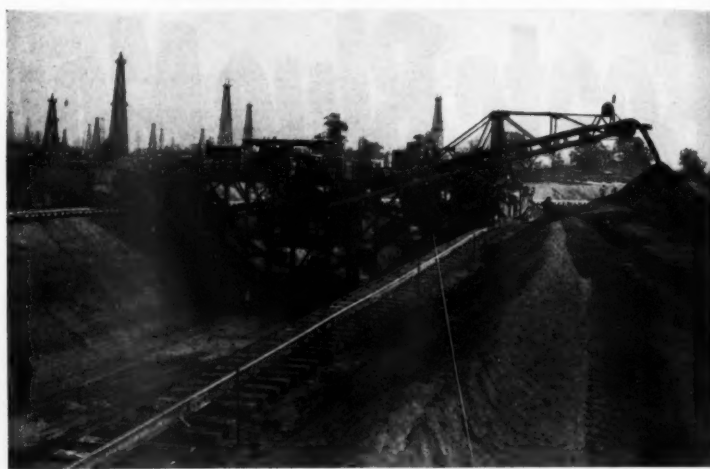
LINING



There were no chutes on the front of this slip form. Kiewit used an across-the-canal diaphragm to distribute the concrete from the two Koebling pavers.



Here's the paving lineup: curing jumbo, finishing jumbo, and slip form. A tank truck transfers water to the storage tanks. The two pavers work at high speed.



A Guntert & Zimmerman trimmer removed the final 4 inches of excavation, using two strings of endless bucket chain.

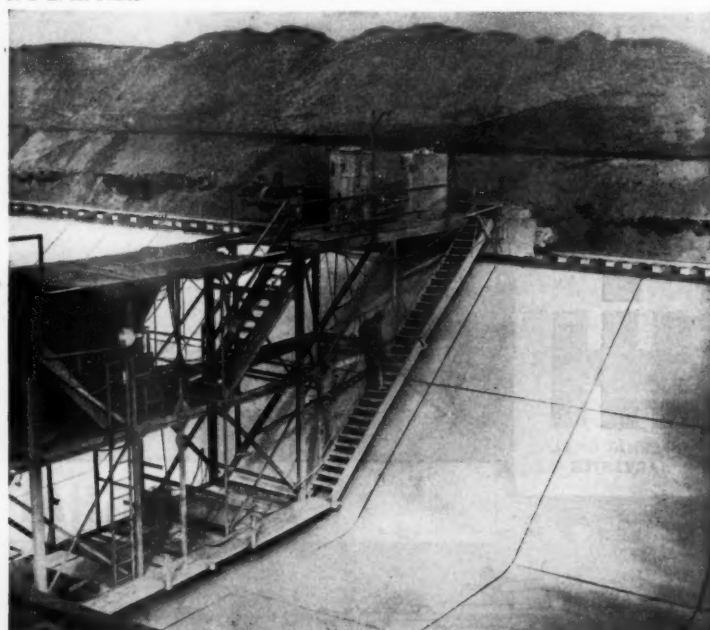
liver additional water to the Central Valley, along the course of the big man-made river. At the takeoff point at Friant Dam the canal carries 4,500 cfs. Farther down, its Q-factor drops to 3,500. There is only a 24-foot bottom in the section just finished, and the canal will deliver 2,500 cfs at the final delivery point.

From Friant Dam takeoff, about 20 miles northeast of Fresno, the big ditch winds southward past Fresno, Visalia, Tulare, Porterville, and Delano. It crosses U. S. 99 and the Southern Pacific railroad, diving under these utilities through huge concrete siphons.

The astronomical quantities of mate-

(Continued on next page)

C. & E. M. Photos



Munt Process Co. furnished and applied the curing solution, Munt Process White. The Kiewit firm furnished the curing jumbo which followed closely the finishing frame.

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County. Digging was easy, and even deep sand failed to give trouble. The weather was so perfect that Kiewit's men lost only 3 days in over 2 years because of that factor.

But the main story—the story that everybody likes to emphasize—is the vast improvement on canal-building technique when the last job is compared to the first. There are men on this last job who believe the canal crew at Shafter was the best outfit ever assembled. Naturally, they might get an argument regarding that belief from other contractors, but they were plenty good. Detailed production figures wouldn't be fair, but it can be said that this crew averaged 1,900 feet of lining per 9-hour day for over 6 months, and that 2,276 feet went in one record day.

Improvements Made

Some of the canal-building improvements are exclusive with the Kiewit organization; some aren't. A better way to handle concrete in the slip form was developed when the delivery system from the two Koehring pavers was set up. The improved method sees concrete from the pavers conveyed to a common receiving hopper, and delivered by conveyor from that point to the slip-form receiving hopper. One delivery car on the slip form can spread all the concrete two pavers can mix.

A single steel diaphragm, rather than separate delivery chutes to the foot of the slip form, has speeded up the concrete paving and made it possible to use wetter concrete with the same uniform good results. They cured one very bad and expensive field headache by reducing the impulses on the built-in vibrators from 6,000 to 2,800 per minute. They learned to take the vibrators out on Saturday, take them all apart even when nothing was apparently wrong, and service them carefully. They found a vibrator lubricant which The Texas Co. makes, called Marfak M, which would stand the terrific heat and punishment the vibrators had to take.

They discarded the old system of steering and driving both liner and trimmer. General Electric introduced a variable-speed motor that was just the thing for this work. Now steering is so completely automatic that they never worry even when the machines go around curves, because electric brains make one set of wheels turn slightly faster than the others. It keeps the machine straight and true.

And the Bureau of Reclamation deserves credit, too. The Bureau recognized that the first function of a canal lining is to stand the flow of water. So while ultimate strength was still borne in mind, the Bureau gave Kiewit enough sand in the concrete mix to speed work along and make finishing a bit easier.

It used to be that the heavy 140-ton lining and trimming machines had to be dismantled and moved several times during a job. Not any more. Three moves were necessary on this project, but Bigge Drayage Co. of Oakland has developed a trailer moving technique that carries the ponderous machines ahead, intact.

Moreover, it takes only about 5 hours to get the trailers under the rigs and start them off to the next location. They simply dig out an easy ramp for the trailer, and skid the canal equipment up in place with winch trucks and hardwood rollers. Other contractors have used this scheme, too, but nonetheless it is one of the late refinements in canal building.

An improvement was even made on excavation. A special 14-foot steel wing was made to fit like a big ear off the bulldozer blade of a D8 Caterpillar tractor. When Peterson Tractor & Equipment Co. of San Leandro finished with it, Kiewit had a tool which helped greatly in the preliminary excavation of the canal.

Many of the men believe that if the

outfit had another 25 or 30 miles of canal to do, mechanical refinements might be worked out to reduce the amount of cement-finishing labor. It is still a problem. Finishing costs always stand a possibility of being high even when the finishing crew has been reduced to 15 men. The scale of wages for the 14 cement finishers was \$2.30 an hour, plus \$2.50 an hour for the finishing foreman. Until mechanical finishing is perfected to a higher degree, say men like Bill Miller, the outfit hasn't attained its peak of perfection yet.

Excavation Follows a Pattern

The excavation of the canal prism was well organized. At the time canal lining began, excavation had been completed for only 5 miles, so the dirt crews had to move fast to stay out in front of the fast-moving concrete gang.

The canal prism was about 16 feet deep. Bottom width was 24 feet, with 1 1/4 to 1 side slopes. The material was mostly sand, and few rocks were found.

(Continued on next page)



C. & E. M. Photo

A good concrete mix and fine equipment made the lining lie on this steep slope. Only a minimum of finishing was required, but Kiewit's men think they can make finishing even more efficient.

FOSTER'S PILING RENTAL SERVICE

Starts Job Months In Advance Of *Contractor's Plans

*A joint venture of the Western Foundation Corporation and Spencer, White & Prentiss, Inc. and executed under the general direction of the Stone & Webster Engineering Corporation.

"This is the first time a circular steel sheet piling cofferdam, supported by a reinforced concrete wale, has been used in this country... and FOSTER PILING RENTAL SERVICE enabled this job to begin months in advance."

WESTERN FOUNDATION CORPORATION and SPENCER, WHITE & PRENTISS, INC., (N.Y., N.Y.)

Foster shipped 500 tons of Interlocking Steel Sheet Piling for this Cofferdam, used in the construction of water intake for a power plant of the Union Electric Light & Power Company, Venice, Illinois.

ALL YOUR PILING REQUIREMENTS FILLED "FASTER FROM FOSTER"

Foster's Piling Rental Service gives you a "Head-Start" that means extra economy and extra profit by shipping immediately the exact length and exact section of piling the job demands. No deposit is required, and Foster's rental rate gives you a low fixed expense as an added competitive advantage when bidding on jobs.

Send for New Free Piling Reference Wall Chart CE-2

Pile Hammers & Extractors (Rental) • Rails • Track Accessories • Pipe & Pipe Fabrication • Wire Rope & Slings



L.B. FOSTER co.

Pittsburgh 30, Pa. • Chicago 4, Ill. • New York 7, N. Y. • Houston 2, Texas

Friant-Kern Canal Nearing Completion

(Continued from preceding page)

At the point where the canal was completed, the soil was deep and easy to dig.

The first 2 feet of excavation was made by a Caterpillar elevating grader, drawn by one of the D8's assigned to the project. Then a fleet of 5 LeTourneau Model W Carryalls, with D8 Caterpillars pulling, took out the next 2 feet. Excavated material was spoiled in neat piles on both sides of the canal.

A fleet of three draglines next moved in to rough in the canal prism. There was a Northwest 95 with a 3-yard bucket, a Model 6 Northwest with a 2-yard can, and a 2-yard Bucyrus-Erie 38-B. These machines moved fast and for the most part simply shaped the canal for heavy excavation. They also made the structure excavations where drops, siphons, and overcrossings were to be installed.

The main canal digging was handled by a 5W Bucyrus-Monighan walking dragline, equipped with a 7-yard Esco bucket. As this machine backed up the canal center line and dumped bucket after bucket over the spoil banks, the special slope dozer shaped the banks and moved the excess dirt up to the machine. As much as 2 feet of material was handled by the slope dozer. When it and the Monighan had finished, the canal prism was down to within about 4 inches of final grade.

As the excavation equipment advanced, a service road was built on top or alongside of the spoil bank. This road was carefully graded by a Caterpillar No. 12 motor grader. As traffic compacted the ground, additional bladings and applications of water improved the road. By the time the lining crew came along, the road would accommodate the batch trucks and let them operate at high speed.

Trimming and Lining

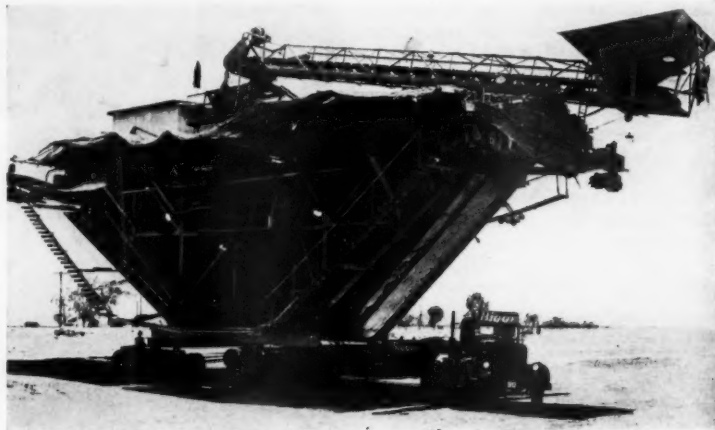
The power trimmer and the concrete slip form were built by Guntert & Zimmerman, at Stockton. They embodied every late improvement in this kind of equipment. During the long run from Friant Dam to the end of the canal, the machines were cut down in size three times.

Some 3,500 canal feet of railroad rails, in 39-foot sections, were allocated to the job. A single line of rails, set along the berm at the top of the canal, let the machines roll along. The sections were picked up and handled by a Hyster crane on a D8 Caterpillar tractor. After they were trucked ahead, the crane unloaded them and set them in place. Survey hubs every 50 feet spotted the rails for line and grade, and helped later to establish a tight-wire reference for final grade.

The final 4 inches of excavation was removed by the special trimmer, which used two strings of endless bucket chain to remove the material. All power on the trimmer was furnished by Caterpillar diesel engines. Passage of the trimming machine left the canal banks and bottom exceptionally smooth. The Bureau of Reclamation allowed a 1-inch tolerance in canal profile grade, but specified in any case that the theoretical amount of concrete had to go in.

Batch trucks from the proportioning plant delivered dry batches to the slip form. Two Koehring Twinbatch 34-E highway pavers took the 1.37-yard batches and mixed them a total of 75 seconds. Mixing water had to be hauled from various points along an irrigation canal in the vicinity. The tank trucks transferred this water to two 2,000-gallon tanks on the slip form. From there it passed by hose to the pavers.

The twin pavers faced opposite from each other, and batch trucks lined up from two ways. At the extremities of haul, when the liner was farthest from



C. & E. M. Photo

Bigge Drayage Co. of Oakland developed this trailer technique for moving the 140-ton lining and trimming rigs. A load in anybody's language.

the batch plant, there were as high as 160 batches of concrete on the road at once. At one time 55 batch trucks were

used. Two-way radio communication between the slip form, the batch plant, and all the key supervisory officials

helped enormously to reduce inefficiency and lost motion.

Fresh concrete from the pavers discharged to a 36-inch conveyor, which in turn discharged to a common receiving hopper. Another conveyor from this bin led over to the hopper on the slip form. One transfer car carried the concrete both ways from this hopper, and dropped it down to the point of placement.

As the liner moved along, its built-in tube vibrators consolidated the concrete and squeezed behind the machine a smooth ribbon of lining. Longitudinal contraction joints at 12½-foot centers were cut in by knives under the slip-form frame. Transverse joints on the same centers were cut in from a finishing jumbo directly behind the liner.

Cement finishing was limited to a light troweling with long-handled steel floats, and to the manual dressing of joints. Finishing Foreman J. L. Smith and his 14 men worked hard, especially when the weather was hot, to leave a

(Concluded on next page)

Speed Trucks in "Stop and Go" Traffic

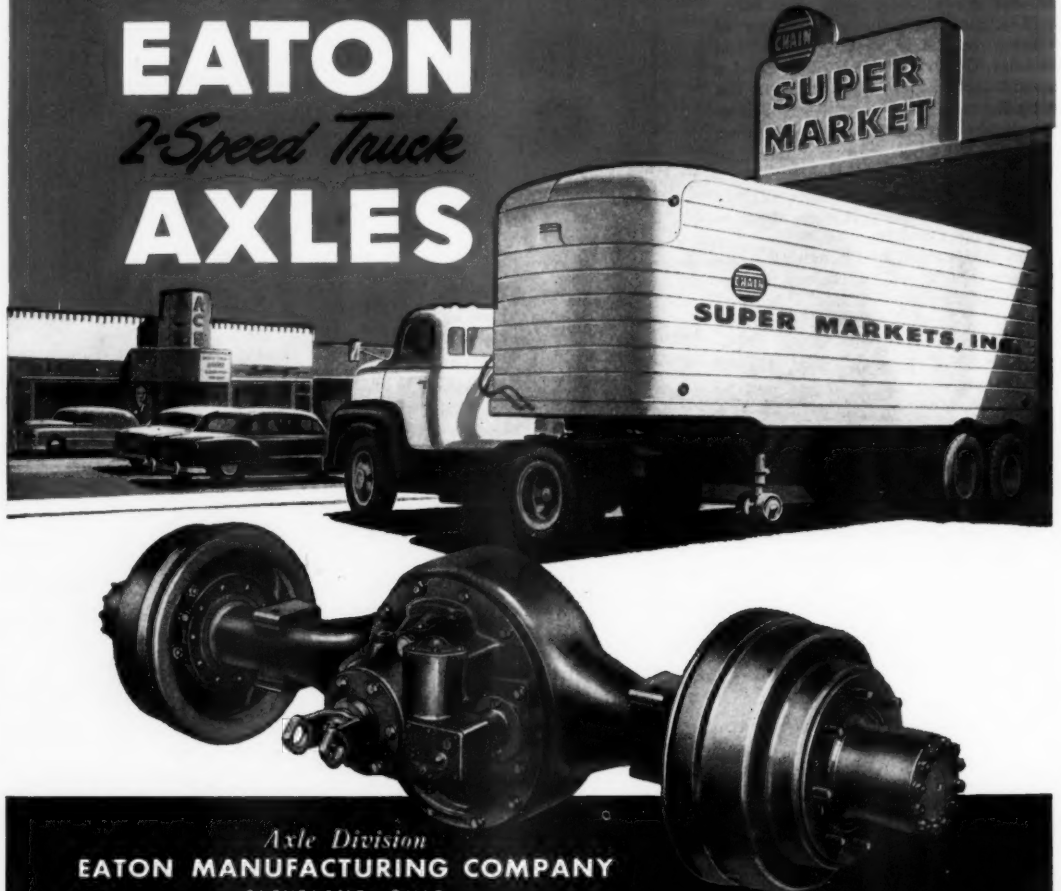
The steady increase in traffic volume is of growing concern to truck operators. Unless trucks can keep pace with the flow of cars, schedules are slowed down and operating costs rise expensively.

Eaton 2-Speed Axles help truck owners solve this problem. Their vehicles have twice the conventional number of gear ratios. That means they can use a "low" gear for quick pick-up under full load. It means easier ma-

neuvers in tight spots. It means climbing most hills faster. It means highballing on the open road. These advantages also result in operating economies—fewer stops for gas and oil—less time in the shop, because engines and all power transmitting parts last longer.

Your dealer will be happy to explain the value of Eaton 2-Speed Axles and tell you how Eaton's exclusive planetary gearing and positive lubrication assure long axle life.

EATON 2-Speed Truck AXLES



Axle Division
EATON MANUFACTURING COMPANY
CLEVELAND, OHIO

PRODUCTS: SODIUM COOLED, POPPET, AND FREE VALVES • TAPSETS • HYDRAULIC VALVE LIFTERS • VALVE SEAT INSERTS • JET ENGINE PARTS • ROTOR PUMPS • MOTOR TRUCK AXLES • PERMANENT MOLD GRAY IRON CASTINGS • HEATER-DEFROSTER UNITS • SNAP RINGS • SPRINGTITES • SPRING WASHERS • COLD DRAWN STEEL • STAMPINGS • LEAF AND COIL SPRINGS • DYNAMATIC DRIVES, BRAKES, DYNAMOMETERS

smooth concrete lining behind. Part of the finishers worked from the slip form; others worked from the finishing jumbo.

Hunt Process Co., concrete-curing specialist from Los Angeles, furnished and installed the curing solution. Hunt Process White was used. The Kiewit firm furnished the curing jumbo, which followed along close behind the finishing frame.

Central Batch Plant

Batch facilities consisted of two Noble 150-ton plants, set up side by side to form a twin layout. Capacity was provided in the silos for 2,700 barrels of cement, or enough for 2,200 feet of canal lining 3½ inches thick. Sand and rock aggregate was produced commercially close by, and the trucking firm of Joe Blasco hauled both the raw batch-plant materials as well as the dry-batched aggregates. Another important subcontractor was Kovick Bros. of Fresno, who installed various underdrains.

Aggregates and sand were piled over a tunnel and hoisted to the batching bins by conveyor. One batch-plant set-up, which was located slightly south of center in relation to the project, did the work on the last contract.

Structures

Building of structures called for some tedious forming. Wherever it was possible, form panels were built at the central yard, where efficient DeWalt power saws and other such equipment would speed the work. The panels were then trucked out to location, and fitted into place. A central yard was also located for cutting and bending the steel reinforcement.

Concrete for the structures was hauled for the most part by truck mixers. It was either chuted directly into place, or transferred by crane and bucket.

Personnel

Field supervision for Peter Kiewit Sons' Co. was under the direction of a group of experienced key men called "The Terrible Seven". They included General Superintendent Keith C. Wasson, Project Engineer J. W. Lowe, Jr., Lining Superintendent James Bett, Excavation Superintendent I. J. Garver, Structure Superintendent W. W. White, Master Mechanic Walter Powers, and Office Manager Al Ellis.

Field operations for the Bureau of Reclamation were under the supervision of Construction Engineer S. S. Leonard and his assistant, Joe Fraps. J. R. Lawrence was the Resident Engineer.

Completion of the Friant-Kern Canal brings to a close one of the important water lifelines to Kern County and the entire Central Valley. Water delivered through the new canal will help to augment dwindling supplies, and many farmers believe the diminishing water table may now be restored. Agricultural productivity of the Central Valley is expected to increase now that the additional water is about to be delivered.

Kennametal in Minneapolis

Kennametal, Inc., Latrobe, Pa., manufacturer of cemented carbide products, has opened a district office in the Metropolitan Bldg., Minneapolis. Harry Brandvik, formerly a service engineer in the Midwestern District, is the company representative in the office.

The company also announces that William J. Collins is now its representative in the New England District, and Frank Price is service engineer in the Middle Atlantic District.

Essick Purchases Sterling

Reversing the usual trend of eastern companies buying western facilities, Essick Mfg. Co., Los Angeles, producer of air-cooling equipment and construction machinery, has acquired all the stock of Sterling Machinery Corp., Kansas City, Mo., manufacturer of self-priming pumps and mining and contractors' hoists. It will operate Sterling as an independent subsidiary.

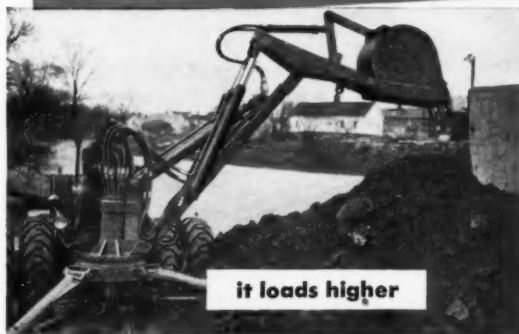
Essick has moved east before. In 1948 it established a plant for manufacturing air coolers in Little Rock, Ark., and in 1949 it acquired the controlling interest in the T. L. Smith Co. of Milwaukee.



Peter Kiewit Sons' Co. Photo

The "Terrible Seven" supervisors on the canal job. Front row, left to right, Excavation Superintendent Garver, Project Engineer Lowe, Jr., and Office Manager Ellis. Back row, left to right, General Superintendent Wasson, Lining Superintendent Bett, Master Mechanic Powers, and Structure Superintendent White.

Now... It's even better!
THE OLIVER-WARE
Hydro-Trencher



..and it has a Sensational New "Forced Ejection" Bucket



By simply reversing the bucket and dipper stick, you get a swing loader that loads out material faster than you'd believe possible. "Forced ejection" bucket is available as optional equipment. Standard trencher bucket and standard swing loader bucket are available at slightly lower cost. With standard loader bucket, loading height is 12 feet. Loading height with "forced ejection" bucket is 12½ feet.

Have you seen the Oliver color movie, "Task Force on Wheels"? Your Oliver Distributor will be happy to arrange a showing.



THE OLIVER CORPORATION

Industrial Division: 19300 Euclid Avenue, Cleveland 17, Ohio

A complete line of Industrial Wheel and Crawler Tractors

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Hoosiers Widen Road, Top It With Cold-Mix

Indiana Highway Is Widened From 18 to 24 Feet, Then Given Two Layers of Plant-Mix and Double Seal

• AT the height of the construction season last year, the State Highway Commission of Indiana at one time had 35 bituminous-resurfacing contracts under way. One such contract on a major route was the widening and resurfacing of U. S. 30, heavily traveled east-west artery crossing the northern part of the state. The section improved covered 7 miles between Wanatah and Hanna in LaPorte and Porter Counties. Included in the \$180,000 project was a 3-mile stretch of U. S. 35 running north from its inter-

section with U. S. 30 at Hamlet in Starke County. The connecting gap between these two parts of the contract had been resurfaced the preceding year.

The Seneca Petroleum Co. of Chicago, Ill., did the work for the Highway Commission, starting in June and finishing by September. On U. S. 35, having a width of 22 feet, the contract called for the laying of a cold-mix bituminous binder in two courses, followed by a double bituminous seal coat. On U. S. 30 the 18-foot pavement was first widened to 24 feet before the double-binder and seal-coat surfacing was put on.

The existing pavement on this section of U. S. 30 was a waterbound macadam that had been surfaced with Kentucky rock asphalt about 25 years ago. In the widening operations a 3-foot 3-inch strip was added on each side to form a base 24 feet 6 inches in width. On this went the 24-foot surfacing; the extra 6-inch base on each side helped to prevent raveling at the edges. Because of right-of-way limitations in some areas, the widening had to be added all on one side. On about 8,000 feet of the project the extra 6-foot 6-inch width went along one edge.



C. & E. M. Photo

An International truck gets loaded at the Barber-Greene continuous-mix plant, Seneca Petroleum Co. hired the trucks and paid on the ton-mile basis.

Widening Operations

Where the widening was all on one side, the contractor handled the trenching operations with the blade on a Caterpillar No. 12 motor grader. Over the rest of the job the 3-foot 3-inch trench on each side was dug by a Buckeye trenching machine, running on rubber tires, to a depth of 9 inches below the grade of the existing pavement. Over the bottom of the trench a 1½-inch layer of subgrade fines was laid to insure proper drainage. Like all the material going into the job, the fines were crushed stone. This insulation course, No. 63 stone, was compacted by an

(Continued on next page)

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TABLE OF ASTM A305 SPECIFICATIONS

Bar-No. *	Unit Wt. Lbs./Ft.	NOMINAL DIMENSIONS ROUND SECTIONS			REQUIREMENTS OF DEFORMATIONS		
		Diameter-Inches Decimal	Cross Sectional Area Sq. Inches	Perimeter	Max. Avg. Spacing In.	Min. Height Inches	Max. Gap, Inches
2†	0.167	0.250	0.05	0.785	...	...	...
3	0.376	0.375	0.11	1.178	0.262	0.015	0.143
4	0.668	0.500	0.20	1.571	0.350	0.020	0.191
5	1.043	0.625	0.31	1.963	0.437	0.028	0.239
6	1.502	0.750	0.44	2.356	0.526	0.038	0.286
7	2.044	0.875	0.60	2.749	0.612	0.044	0.334
8	2.670	1.000	0.79	3.142	0.700	0.050	0.383
9‡	3.400	1.128	1.00	3.544	0.790	0.056	0.431
10‡	4.303	1.270	1.27	3.990	0.889	0.064	0.487
11‡	5.313	1.410	1.56	4.430	0.987	0.071	0.540

*Bar numbers are based on the number of 1/8 inches in the nominal diameter of the section.
†Bar number 2 in plain rounds only.
‡Bars numbered 9-10-11 correspond to former 1" sq., 1 1/8" sq., and 1 1/4" sq. sizes, and are equivalent to those former standard bar sizes in weights and nominal cross-sectional areas.
‡Chord of 12 1/2% of Nom. Perimeter.



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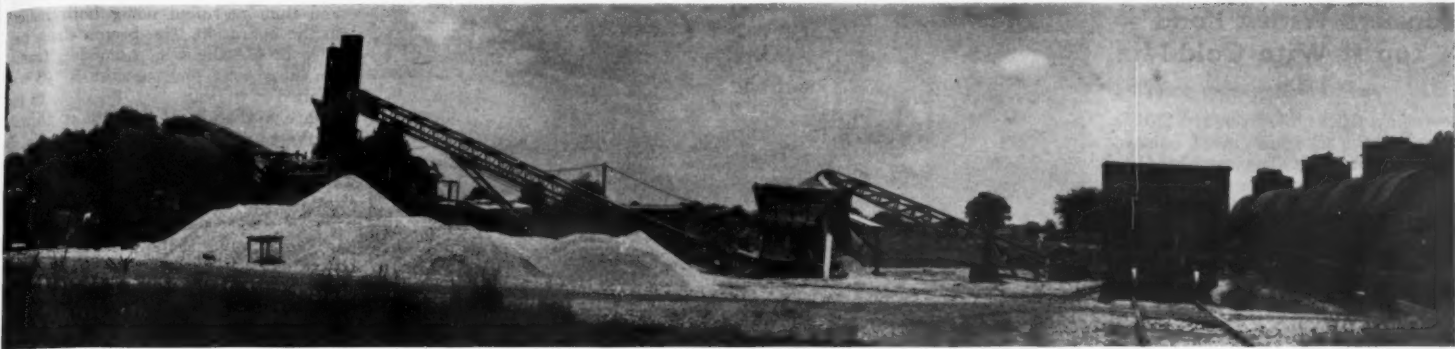
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C. & E. M. Photo

This Barber-Greene continuous-mix plant furnished widening material and binder for a surfacing job in Indiana. At left is the asphalt-storage tank; at right is a tank car. The conveyors are shown unloading stone.

Apsco trench roller, which also rolled the bottom of the trench after it was dug. Where the ground was very hard it was first scarified with the teeth on the grader before the trenching machine began working.

An Apsco spreader laid all the material put into the widening. The initial layer of fines was next covered with 8 inches of stone mixed with RC-5 asphalt, put down in two 4-inch layers. This filled the trench, bringing it up to the level of the old pavement. Here the stone was No. 4C, and the bitumen used in the mix averaged 3 per cent of the total weight. As each layer was placed it was compacted by the Apsco trench roller. The contractor used two Apsco spreaders and two trench rollers, one set laying the subgrade fines and the other on the widening material.

Before the surface mix was laid, the old pavement was primed with RC-2, asphalt applied at the rate of 0.1 gallon to the square yard by an Etnyre 850-gallon distributor mounted on a GMC truck. The bitumen was shot half the road width at a time, including the widening strips, at a temperature between 175 and 190 degrees F.

Mixing Plant

The widening material and the binder for the surfacing were mixed in a Barber-Greene continuous-mix plant that was set up near a siding of the Monon Railroad close to the west end of the project in Wanatah. Crushed stone came from the Monon Quarry at Monon, Ind., about 40 miles from the plant site, delivery being made by rail. Asphalt was furnished by both the Ohio Oil Co. from Robinson, Ill., and the Texas Co. from Lawrenceville, Ill.

The bitumen was shipped in tank cars to the job siding, where a 3-inch pump transferred it to a 10,000-gallon storage tank.

Smooth, efficient handling of the crushed stone was one of the features of the plant; on an average, 14 to 15 cars were generally unloaded in a day. The hopper-bottom railroad cars were maneuvered over an unloading pit at the siding by an Oliver tractor. As the cars were dumped, the stone dropped onto a Triangle conveyor having a belt 24 inches wide x 40 feet long which moved the material up to a 20-ton storage bin. A General Electric 20-hp motor operated the conveyor.

From the hopper at the bottom of the stone bin, a Uenco conveyor—24 inches x 60 feet long—carried the aggregate up to the Barber-Greene dryer where it was heated. A Wisconsin gasoline engine furnished the power for this second conveyor. The dryer, 6 feet in diameter x 25 feet long, was heated by a single Hauck burner and revolved by a Le Roi gas engine. As the hot stone discharged from the big drum, it was picked up on a third conveyor, 24 inches x 40 feet, driven by a Wisconsin engine, which carried it along to the B-G continuous-mix plant.

Cold Mix

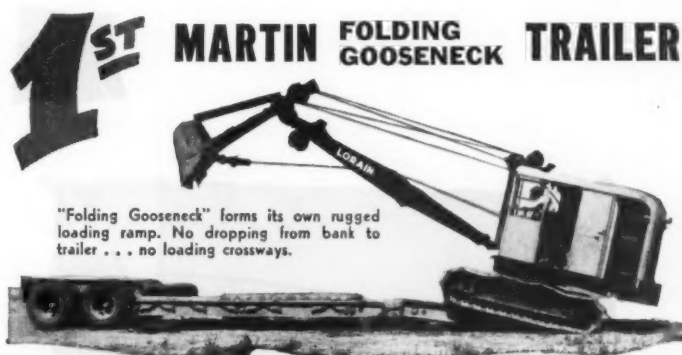
A Kewanee 65-hp oil-burning boiler equipped with a Hauck burner supplied the necessary steam for the plant operation. Boiler water was pumped from a well on the site and stored in a 4,500-gallon tank. A Caterpillar 100-hp diesel-electric generator set supplied power for four motors used at the plant—the aforementioned large unit for the first conveyor, and three smaller mo-

tors to run the water pump, fuel-oil pump, and compressor.

For the binder surfacing course No. 9 stone was used in the mix together with RC-5 asphalt that averaged 4.6 per cent bitumen by weight. While the stone was heated to between 180 and

200 degrees F, and the bitumen heated to from 250 to 275 degrees F, these temperatures were low enough for the mixture to be considered a cold mix. Material from the continuous-mix plant was loaded into a

(Concluded on next page)



IS STILL NO. 1

with Frank Poetter, Lewistown, Montana, Contractor

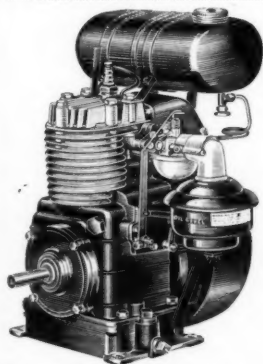


● Frank Poetter bought the first Martin "Folding Gooseneck" Trailer to roll off the assembly line at Martin's Kewanee, Illinois, plant. That was several years ago. Right off, it was No. 1 with him, and it still is! Listen to what he says: "My Martin 'Folding Gooseneck' is the trailer I had looked for ever since my first day handling heavy equipment. There is no other trailer that I have used that compares with it!"

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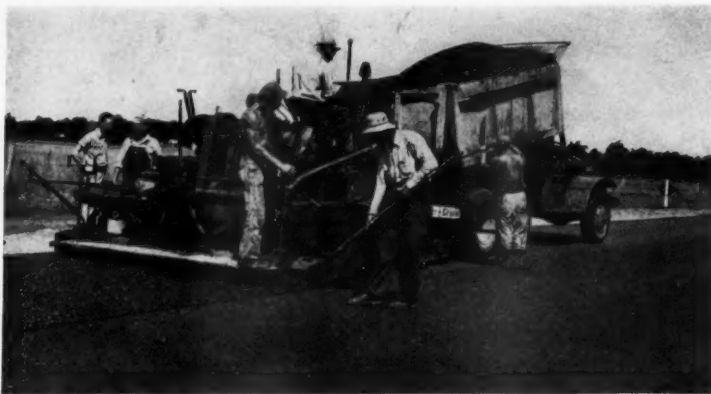
KEWANEE
ILLINOIS

Hoosiers Widen Road, Top It With Cold-Mix

(Continued from preceding page)

fleet of six trucks that averaged 13 tons a load. The trucks were hired, paid on the ton-mile basis. The average daily production of the plant was 900 tons in 9 hours, or 100 tons an hour.

The binder material was laid by a Barber-Greene Finisher in two courses, the first or leveling course being about 1¾ inches thick, and the upper layer averaging 2 inches in depth. The same material was used for both layers, and when it was laid its temperature varied between 160 and 180 degrees F. The Finisher laid the mix in 12-foot lanes, half the pavement width at a time, at the rate of 9,000 feet in 8½ hours. Each course was compacted by rolling with two Galion rollers, first with an 8 to 10-ton tandem, followed by a 10-ton 3-wheel Chief. The usual procedure was to lay the entire first course of binder before putting down the second.



C. & E. M. Photo

A Barber-Greene Finisher lays the upper course of binder on U. S. 30 in Indiana. An International truck dumps its load.

Seal Coat

The cold mix was sealed with a double bituminous coat. It was first given an initial shot of RC-3 asphalt applied at the rate of 0.15 gallon to the

square yard at 175 to 190 degrees F. This was covered with No. 12 stone, put on by a Buckeye spreader at the rate of 15 pounds to the square yard. The seal was rolled, broom-dragged,

and then re-rolled using both rollers in the operation. The broom drag had wire bristles held in a wooden frame. On the second seal coat the RC-3 was applied at the rate of 0.10 gallon to the square yard and covered with 10 pounds to the square yard of No. 12 stone. It was rolled, broom-dragged, and re-rolled as was the first seal coat. The total thickness of pavement averaged 3½ to 4 inches when compacted.

The gradation of the various crushed-stone sizes used on the project was as follows:

Sieve Size	Per Cent Retained On			
	No. 63	No. 4C	No. 9	No. 12
1½-inch	0	0	....	....
1-inch	0-5	10-30	....	....
¾-inch	10-25	30-60	0	....
½-inch	20-50	70-90	10-35	0
No. 4	45-75	95-100	90-100	20-50
No. 8	75-90	....	98-100	60-100
No. 30	....	....	98-100	96-100

At the start of the job the first lane was put down with traffic being maintained on the other half of the road. Traffic was so very heavy, however, that the work was being constantly hampered. Consequently the highway was closed, and traffic detoured for the rest of the surfacing. On U. S. 35 the 22-foot width was paved in two 11-foot lanes.

Quantities and Personnel

The major items in the cold-mix paving project included the following:

Binder material	19,747 tons
Stone chips for seal	2,045 tons
Bituminous prime	17,672 gals.
Bituminous seal	49,846 gals.
Subgrade fines for trenching	2,139 tons
Bituminous aggregate for trench	8,796 tons

The Seneca Petroleum Co. employed an average force of 18 on the contract, not including truck drivers, under the direction of Clarence Smith, Superintendent.

For the State Highway Commission of Indiana, Ed Davis was Project Engineer and Melvin Neuman was Inspector on the paving. The job is located in the LaPorte District of which John A. Kelley is District Engineer.

The Commission is headed by Samuel C. Hadden, Chairman, with Ray H. Bower, Chief Engineer. Fred L. Ashbacher is Engineer of Road Construction.

Replaceable-Point Teeth For Excavators, Trenchers

An 8-page catalog on a full line of replaceable-point teeth for shovels, backhoes, draglines, loaders, rippers, trenching machines, and scarifiers is available from H & L Tooth Co., P. O. Box 330, Montebello, Calif. It highlights the special sharp shape of the H & L tooth, which is obtained by its two-piece construction. The points are made of high-grade forged alloy steel, heat-treated to insure toughness and provide maximum resistance to wear under abrasive conditions, the catalog says. Illustrations show each available type, and a chart simplifies ordering. Also included are instructions for changing the points, both the Flex-Pin and the Crimp-On types.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 758.

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The new 300, 400 and 500-ampere Wilson Bumblebee arc welders are available in both indoor and all-weather models.

Three Arc Welders

New 300, 400, and 500-amp Wilson Bumblebee arc welders, available as indoor or all-weather models, have been announced by Air Reduction Sales Co., a division of Air Reduction Co., Inc., 60 E. 42nd St., New York 17, N. Y. Features outlined by the manufacturer include sturdy construction, compactness, light weight, instant arc-starting, wide current range, easy-to-operate controls, and minimum maintenance requirements.

Automatic Hot-Start control with arc-stabilizing capacitors is provided on the 300 and 400-amp models. Current ranges are 60 to 375 for the 300-amp model, 80 to 400 for the 400-amp model, and 100 to 675 for the 500-amp model. Silicone insulation provides safety two ways, Airco reports: it enables the welder to operate safely at high temperatures without breakdown and it is water-repellent. Because there are no rotating parts, with the exception of the fan on the 400 and 500-amp models, maintenance costs are low, Airco says.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 741.

New Hydraulic Puller

A new hydraulic puller weighing less than 10 pounds and developing 15 tons of power has been announced by Owatonna Tool Co., 381 Cedar St., Owatonna, Minn. The OTC Power-Twin has a center hole which makes it adaptable to all OTC pulling systems now in use, the company states.

Because of the center hole and the twin cylinders on the new unit, it can get at "inaccessible" jobs. It is 5½ inches high, works in any position, and is said to be fast and easy to operate. The ram travels 2 inches, which is said to be adequate for 95 per cent of the pulling jobs.

The remote-control pump develops 10,000 psi. Six feet of high-pressure hose allows the operator to stand at a safe distance from work. Wire guards protect the hose and special nonleak couplers are tested for 24,000 pounds.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 829.

Adjustable Scaffolding

A new bulletin about steel and aluminum scaffolding and allied equipment for building contractors is offered by Automatic Devices, Inc., 1260 Hodiament Ave., St. Louis 12, Mo. The exclusive feature of Adjustomatic scaffolding, highlighted in the bulletin, is the positive locking device which eliminates all loose parts. It is said to be unaffected by use, rust, mortar, or wear, and to operate easily throughout the life of the equipment.

The bulletin lists other features and

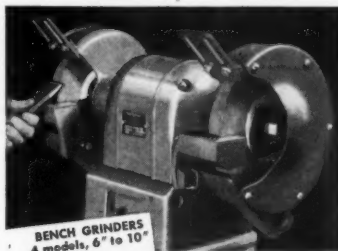
specifications. It illustrates a variety of arrangements available with the standard sections, which include end frames, ladder end frames, cross-braces, putlogs, 5 or 8-inch casters, levelers, extension sleeves, platform and guardrail assemblies, hoisting equipment, and other special equipment.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 815.

Load-Transfer Units

A 4-page folder describing Kelode load-transfer units for expansion and contraction joints is available from Shepler Equipment & Supply Co., 4900 Griggs Road, Houston, Texas. It outlines the salient features of the product and includes illustrated directions for installation. The folder points out that Kelodes are designed for use with any type of expansion-joint material.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 748.



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4 models, 6" to 10"



PORTABLE GRINDERS
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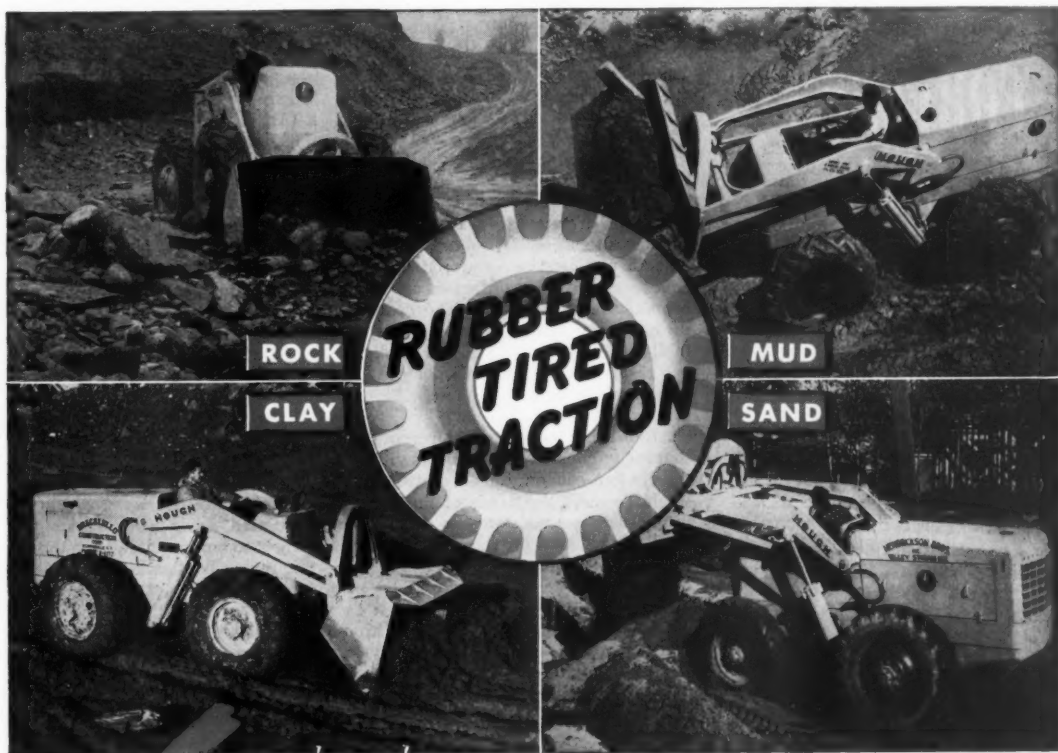
Buy Van Dorn Bench Grinders to bring the work to the tool. Buy Van Dorn Portable Grinders to bring the tool to the work. Bench models have more working clearance, better tool sharpening support. Portable models are perfectly balanced, easy to handle. Both are built with high-quality parts for extra years of service, driven by powerful Van Dorn motors for non-stop performance! See your nearby Van Dorn Distributor. Write for catalog to: THE VAN DORN ELECTRIC TOOL CO., 787 Joppa Road, Towson 4, Md.

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WRITE for literature on any size PAYLOADER: the 1½ yard Model HM; the 1¼ yard HY; the ¾ yard HF; the ½ yard HE; the 12 cu. ft. HA. There is no obligation.



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What's What With Controls and Steel?

Frank Creedon of NPA Reviews Contractors on Construction Controls and the Outlook for Steel and Aluminum

• FRANK CREEDON was the next best thing to an oracle at the February convention of the Associated General Contractors of America. As Assistant Administrator for Facilities and Construction, National Production Authority, he had a lot to say about construction controls and the philosophy behind them—and he said it so anyone could understand.

He mentioned first the three bureaus or "operating shops" that make up the NPA: the Program Bureau, the Manufacturing Industry Operations Bureau,

and the Facilities and Construction Bureau. Apropos of the third, he stressed the fact that the construction industry has a much higher position in the Government than it ever had before, at least from the organizational point of view.

Then, taking up the Facilities and Construction Bureau, he went into detail on its Construction Controls Division, analyzing the NPA's philosophy on controls.

Why Controls Anyway?

It was apparent to the NPA, in its talks early last year with the Munitions Board, that military needs for steel and other short materials were going to be great. First, the NPA would have to provide for those needs. Second, it would have to minimize dislocations in the civilian economy that might result from the military "take".

At first the Munitions Board said it would need about 15 per cent of the total U. S. production of structural steel. Therefore the NPA set aside 15 per cent of each plant's monthly production. The plant was to accept DO-rated orders on that 15 per cent set-aside; it did not have to accept rated orders on anything beyond that 15 per cent. The order is the only priority rating the NPA has established so far, said Mr. Creedon. Its net result was to leave 85 per cent of structural-steel production for the civilian economy.

At the same time, the NPA recognized that many construction projects vital to the civilian economy needed structural steel. To meet the needs of these vital projects, it was necessary to limit less-vital construction for recreation, entertainment, and amusement. Accordingly, order M-4, which went into effect last October 26, imposed this limitation; its major exemption was small jobs that would require only a \$5,000 outlay in any 12 months.

It was soon apparent that the Military had underestimated its needs. Its own

program, and the expansion program of plants engaged in military contracts, would take more than 15 per cent of the structural-steel output. So the NPA increased the set-aside to 20 per cent last December. Restrictive orders also went into effect on other steel products and other metals in short supply.

But what of supporting programs not directly linked to military procurement but vital to national defense—the expansion of steel and aluminum plants, for instance? What of freight cars, locomotives, ore-carriers for the Great Lakes, and oil wells? All of these were needed, and all would need steel and other "short" metals. A 20 per cent set-aside wouldn't be enough. Accordingly, the middle of last January saw the second increase in the structural-steel set-aside—from 20 to 35 per cent. That left only 65 per cent for normal civilian demands, with a similar situation as to other metals.

To make sure that vital construction projects like hospitals, schools, highways, and bridges got the steel they needed, the NPA took a second "bite" out of construction and imposed the new modified M-4 order which is still in effect.

M-4 Order as It Now Stands

The present order has a List A and a List B. List A limits recreation, entertainment, and amusement projects about as the first order did. List B sets forth other types of construction that are restricted and that cannot be started except after obtaining specific NPA go-ahead. If a structure of any of these types was started before January 15, construction may continue. If prohibition of the project would cause unreasonable hardship to the concern, an exception may be granted.

So that administrators of the order will have some knowledge of local conditions and can determine "unreasonable hardship", the order is administered in the regional offices of the Department of Commerce, with a further breakdown to district offices in heavily populated areas. Anyone wanting his project to be exempted from the restriction makes application on an NPA form that he can get from the Commerce offices.

Here are the projects that you have to get licenses for, as Mr. Creedon listed them: a bank, credit, or brokerage establishment; a community or neighborhood building; a personal-service struc-

ture such as a barbershop or beauty shop; a garage, service station, or repair shop; a laundry or dry-cleaning or tailoring establishment; a hotel or motel or trailer camp; a loft or office building; an outdoor advertising sign; printing and duplicating establishments; restaurants. Also, a building for the storage, distribution, display, or sale of consumer products—for example, retail stores, shopping centers, wholesale establishments, gasoline-filling stations, drugstores, soda fountains, florist shops, greenhouses. There is, however, no prohibition against wholesale food stores, wholesale supply facilities for fuel oil, gasoline, or coal; gas-distribution systems or pipelines.

There is no NPA restriction on housing, Mr. Creedon said (though the Federal Reserve Board's Regulation X actually limits housing). Maintenance and repair work is not affected in any way. The small-job exemption of \$5,000 in the original order still stands, and applies to List B as well as to List A.

(Concluded on next page)

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★ Less Fuel Consumption
★ "Job-proven" Equipment



Contractors throughout the country have learned that Hopkins' low pressure burning equipment steps up production, provides greater efficiency, and reduces fuel costs.

Hopkins makes the only complete "package unit" combustion system for asphalt plants—easy to install and operate, dependable, efficient, and adaptable to any dryer size or design. Why not get these money-saving advantages for your asphalt plant? Write today for literature and complete details.


Hopkins' Volcanic Specialties, Inc.
Alliance, Ohio

ROSCO
MINNEAPOLIS
MAINTENANCE
UNITS

TRUCK MOUNTED
for Driveway or Highway

with these Distributor Features:

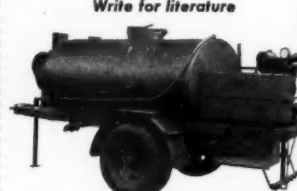
- Load...Transfer...Spray... Handspray...Circulate...Suck-back...Cleanout...Gravity Draw-off.
- Constant sprayline pressure maintained through by-pass valve to tank.



Truck Mounted Model RHU

This low cost machine is designed for jobs that would not be economical to handle with large distributors. For the smaller operator who wants to do more work—as well as for the larger operator for whom no job is too small. A complete road and street maintenance unit for cities, towns, counties and states with limited budgets.

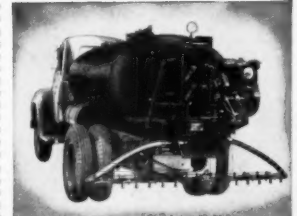
Write for literature



Trailer Mounted Model RHU

BITUMINOUS EQUIPMENT

ROSCO MANUFACTURING CO.
3118 Snelling Ave. • Minneapolis 6, Minn.



Rear view of Model RHU showing style "C" circulating spraybar

Reconstruction following disaster can proceed. Construction for and on account of the Department of Defense and the Atomic Energy Commission is still exempted. The importance of communications exempts television and radio-broadcasting buildings, as well as newspaper and printing establishments (as long as they are operated by a publishing company primarily for the publication of books and periodicals).

If none of these exemptions pertains to a proposed project, but if the owner still applies for an exemption, the NPA judges his application according to the following criteria: Does the project further defense? Does it afford needed facilities in areas near military establishments or defense plants? Is its construction essential to public health or safety or welfare? What will be the effect on the community if the project does not go ahead?

The NPA seeks, in general, said Mr. Creedon, to reduce all construction to the minimum necessary for the defense effort. It seeks to reduce the consumption of materials and equipment used in construction—either by eliminating projects that are not essential, or by deferring those not needed at once, or by changing design to favor the use of materials most plentiful. It is trying to administer the order as intelligently and sensibly as it can, he said.

Steel—Will There Be More?

As for the steel outlook, Mr. Creedon tried to answer the questions "How much more can we expect?" and "When will it start coming in?"

The NPA has approved the construction of new facilities to produce an additional 15,750,000 tons of steel ingots. Early this year Mr. Creedon wired steel-company presidents asking what tonnage each company expected to bring in during the next 6-month periods. Here are the expectations based on those replies:

By June of this year, 1,916,000 more tons. In the second half of this year, 2,732,000 more tons. From January to June next year, 3,209,000 more tons. From June to December, 4,514,000 more tons. And in 1953, about 1,346,000 more tons.

That's a 16 or 17 per cent increase over the capacity in January of this year. But Mr. Creedon reminded his listeners that to produce more steel, you also have to use more steel, for new production facilities.

And Aluminum?

The present capacity of the aluminum industry is 761,530 tons of ingots. There is an expansion under way of 536,000 tons. Most of it will get in by December of this year, and all of it by 1952.

With all these expansions, said Mr. Creedon, "I am hopeful that we can, in the not-too-distant future . . . discontinue entirely construction control, and, with it, the organization that administers it."

Contractors may have judged Mr. Creedon's hope a dim one, but they came away from his talk a good deal surer about what's what with construction controls, and why.

"Stop Murder", Says Booklet

A new safety booklet designed to focus public attention on the need for better highways has been published by Caterpillar Tractor Co., Peoria 8, Ill. More than 300,000 copies are being distributed in an effort to publicize the theme that better roads mean safer roads.

The booklet is a compilation of advertisements that appeared in *Saturday Evening Post*, *Time*, and *Newsweek* during 1949 and 1950. The title of the booklet is "Stop Murder", taken from the first two words of the lead advertisement which is entitled "Stop Murder at the Crossroads".

Seven pages in four colors and a

cover in black and white make up the booklet. It is being distributed to safety agencies, directors of state highway departments, state governors, Federal agencies, contractors, etc.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 705.

PCA Film on Penn Turnpike

"Pennsylvania's Great Highway" is a new 19-minute Kodachrome motion picture describing the construction of the original section and the extensions to the Pennsylvania Turnpike. The Portland Cement Association produced the 16-mm film through the courtesy of the Pennsylvania Turnpike Commission. Copies may be secured for showing by writing to the PCA at 33 W. Grand Ave., Chicago 10, Ill. Indicate the name and size of the group to whom the film will be shown, and list at least three choices as to date of showing. A minimum of three weeks' notice should be given.

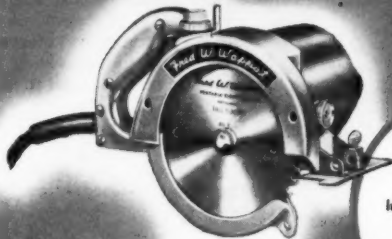


At the site of the new American Cyanamid plant at Michigan City, Ind., a Caterpillar D7 with a No. 75 bulldozer uproots trees.

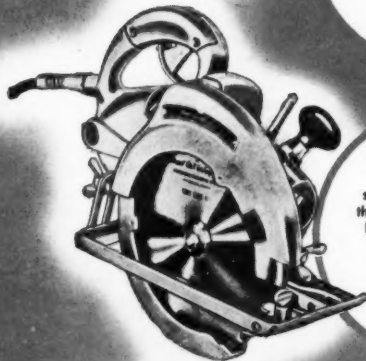
Fred W. Wappat

SAWS

FAMOUS FOR MORE THAN 25 YEARS
THOUSANDS IN DAILY USE!



MAXAW
6 1/2 in. Blade
Cuts 2 1/4" on a square cut. At 45° cuts thru 2 in. dressed lumber with blade to spare. Weighs only 10 lbs. It's the outstanding buy of the field for the house builder.
Only \$69.50



MODEL A-8
8 in. Blade
Cuts 2 1/2" on a square cut. At 45° cuts thru lumber 2 1/2 in. thick. Base adjusts vertically for depth of cut from 1/4" to 2 1/4". Blade speed is 3600 R.P.M.
Only \$135



MODEL A-9
9 in. Blade
Cuts 3 1/4" on a square cut. At 45° cuts thru lumber 2 1/2 in. thick. Base adjusts vertically for depth of cut from 1" to 3 1/4". Blade speed is 3400 R.P.M.
Only \$155

FOR RUGGEDNESS

The frame of every Fred W. Wappat saw is strong, compact, light weight aluminum. Every moving part is mounted on oversize, long life ball bearings. Switch in all models is momentary contact type, with 100% overload capacity. Gears are of finest steel, precision cut and ground for smooth, quiet operation and long life.

FOR DEPENDABILITY

Because Fred W. Wappat saws have been field tested for more than 25 years dependability is assured, resulting from constant engineering and mechanical improvements. Only the finest of machine tool equipment is used for every machining operation to insure precision workmanship.

FOR PERFORMANCE

Model for model you get greater depth of cut on a square cut; larger capacity for bevel cuts at 45° in Fred W. Wappat saws. This added performance enables you to buy a lighter, more compact, easier to handle tool for your work . . . and at a substantial savings to you in initial cost.

Fred W. Wappat

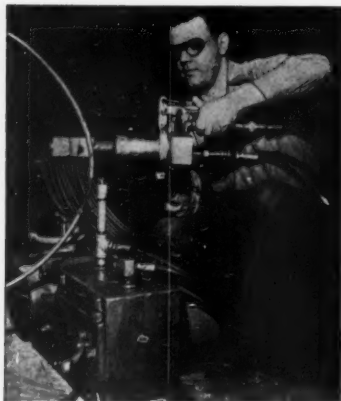
DIVISION OF CUMMINS - CHICAGO CORPORATION

MAYVILLE, NEW YORK • ON CHAUTAUQUA LAKE

In Canada: J. S. Broadfoot Company, Limited, 403-6 Terminal Bldg., Queen's Quay West, Toronto 1, Canada.

POWERFUL ELECTRIC SAWS

FOR MORE THAN 25 YEARS



The new Guillotine hydraulic cutting unit affords a 60,000-pound thrust.

New Hydraulic Cutter

A new hydraulic cutter for large-diameter rod, bar shapes, chain, bolts, wire rope, and cable has been developed

by Manco Mfg. Co., Bradley, Ill. The cutting head of the Guillotine 20E weighs 38 pounds. It is said to cut rod and bars up to 1 1/4 inches in diameter, wire rope up to 1 1/4 inches, and cable up to 3 1/2 inches. The cutting head is connected by 25 feet of flexible hose to a high-speed hydraulic pump. The pump is semiportable and can be dolly-mounted for complete mobility. It is available with either of two power units—a 2-hp electric motor or a portable gasoline engine.

The operation of the Guillotine has been simplified, the company says. With the pump on, the operator simply closes the remote hand valve to obtain a 60,000-pound cutting thrust. Release of the hand valve provides automatic blade retraction.

The Guillotine can also be adapted for swaging, punching, riveting, and pressing—using hand, air, or electrically powered hydraulic pumps.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 821.



A cut-down truck cab on a GMC carrier for the Quick-Way shovel helped solve the problem of transporting this rig over the highways. The Northern Pacific Railroad owns this particular truck shovel—hence the name Nor Pac No. 50.

Easy Highway Moves With Cut-Down Truck

A cut-down truck cab on the GMC carrier for the Quick-Way shovel helped solve the problem of transporting the construction rig over highways. With the thought that this improvement would stimulate sales for mobile truck shovel combinations, the "Quick-Way" Truck Shovel Mfg. Co. and GMC Truck and Coach Division, General Motors Corp., collaborated in the improvement of this unit.

The lower portion of the right-hand door was left intact and the section of the cab which remained after the top of the cab was removed was utilized for a large toolbox which carries the necessary chains, cables, winches, blocks, etc. for the operation of the shovel. The boom and shovel clearance thus permitted by the cut-away cab provides compactness essential to highway travel.

Further information may be secured from the "Quick-Way" Truck Shovel Mfg. Co., Box 1800, Denver 1, Colo. Or use the Request Card at page 16. Circle No. 789.

California Road Building Faces Complete Shutdown

Unless Federal priorities are granted, California faces a complete shutdown of its highway construction program, says Charles H. Purcell, State Director of Public Works. He made the statement at a Governor's Council meeting. He also said he had petitioned Defense Mobilization Chief Charles Wilson to provide materials and manpower necessary to forestall the shutdown.

The TOUGHER they are..



WARRINGTON-VULCAN

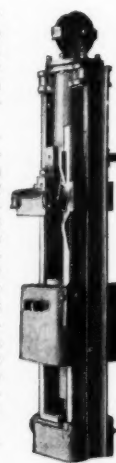
Single-Acting Steam

PILE HAMMERS

• This rugged pile driver doesn't monkey with the tough ones. It socks 'em and sinks 'em with scientific power that saves strain on the pile and the pile hammer.

The rapid, regular continuous action of the Single-Acting Warrington-Vulcan is readily adapted to driving all types of piles—wood, steel or concrete. It operates at medium steam pressure and delivers a moderate frequency of low velocity blows from a relatively heavy ram. Money-saving performance, sturdy construction and simple design exposing all working parts for easy accessibility have made this pile driver a favorite on the tough jobs since 1887.

Full details, without obligation. Write today.



VULCAN IRON WORKS Since 1852

329 North Bell Avenue

Chicago 12

---Illinois

The Operators' Choice..

OWEN BUCKETS

For Maximum Maneuverability

Maximum Penetration

Capacity Loads

Rapid Complete Discharge

Buckets AND Grapples

Write for Catalog

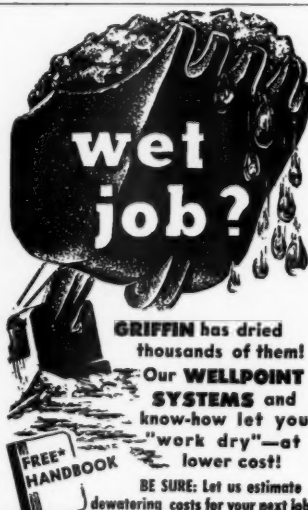


"A mouthful at every bite."

THE OWEN BUCKET CO.

6030 Breakwater Avenue • Cleveland, Ohio

Branches: New York; Philadelphia; Chicago; Berkeley, Calif.



GRIFFIN has dried thousands of them! Our WELLPOINT SYSTEMS and know-how let you "work dry"—at lower cost!

BE SURE: Let us estimate dewatering costs for your next job.

GRIFFIN WELLPOINT CORPORATION 881 East 141st Street, New York 54, N. Y.

Please send me free copy of "WELLPOINT SYSTEM in Principle and Practice."

Name..... Title..... Firm..... Address.....

Clip this coupon to your letterhead. FREE to Engineers and Contractors, only. Regular price to all others, \$1.50

President Harry Ford-Tory, Ala. attack. ness 1 to 1927. the Sou ery and of the T Works i tion un owner August dealer

Concrete

Our Sales the Hu count acquire Inc., of Concrete said m

Dealers

Stan Calif., tributo area fo and tar Cleave Stand custom generat ions o asphalt

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Distributor Doings

President of Burford-Toothaker Dies

Harry Toothaker, President of Burford-Toothaker Tractor Co., Montgomery, Ala., died last February of a heart attack. He entered the contracting business in Illinois and Alabama from 1922 to 1927. From 1927 to 1930 he was with the Southern Tractor Co. of Montgomery and then became General Manager of the Tractor Division of Lombard Iron Works in Augusta, Ga. He held this position until 1932 when he became part owner of the Georgialina Tractor Co. of Augusta. He had been the Caterpillar dealer in Montgomery since 1934.

Concrete-Breaker Sales: Correction

Our February news about Tractor Sales Corp. of Los Angeles acquiring the Hurst-Lewis concrete-breaker account contained an error. Tractor Sales acquired the account from Hurst Lewis, Inc., of Pasadena, Calif., and not from Concrete Sawing Equipment Co., as we said mistakenly.

Dealer One of Own Best Customers

Standard Steel Corp., Los Angeles, Calif., has been given an exclusive distributorship in the southern California area for the portable steam generators and tank-car heaters manufactured by Cleaver-Brooks Co., Milwaukee, Wis. Standard will be one of its own best customers, since it intends to use the generators in connection with installations of its new Standard SM Series asphalt plants.

For Heil in South and Midwest

Southern Equipment Sales Co., Columbia, S. C., now represents The Heil Co. of Milwaukee on sales of Heiliners. The distributor company started in 1944 and now features equipment of 70 manufacturers. Walter L. Smith is President, Ray Long is Vice President and General Manager, and Joe H. Harper is Treasurer.

Heil bodies and hoists are the new account of H & H Wheel Service, Inc., Detroit, Mich. The company was founded 32 years ago by the late Rufus H. Hiles, and is now headed by his son, Clare L. Hiles. William E. Essery is Vice President and Robert W. Settle, Secretary.

Cleco Dealers, Mexico, Arizona

The Cleco Division of the Reed Roller Bit Co., Houston, has appointed a Mexico distributor: Monte y Valles, S. A., Vallarta 1-305B, Mexico, 4, D. F. The company will handle the full line of Cleco pneumatic tools, plus parts and accessories.

Equipment Sales Co. of Phoenix, Ariz., is now handling Cleco products in that area.

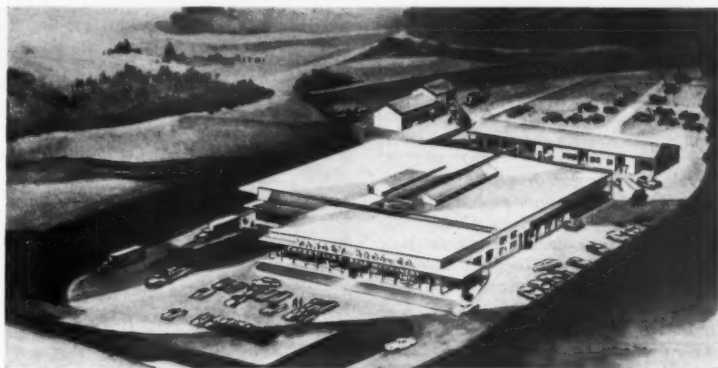
Economou Joins Metalweld, Inc.

Nicholas N. Economou has joined Metalweld, Inc., of Philadelphia as Sales Engineer. He will handle industrial accounts and export trade for the company, whose lines include Worthington-Ransome, Clyde, Lima, Byers, Schield

Bantam, Hetherington & Berner, and Hercules engines, and whose sales territory is eastern Pennsylvania, southern New Jersey, and Delaware. Economou used to be Sales Engineer in the Export Department of Worthington Pump & Machinery Corp.

Serves Johnson in East Wis.

Cunningham-Ortmayer Co. of Milwaukee is now a full-fledged Koehring distributor. For many years it has handled the equipment of Koehring Co. and its subsidiaries Kwik-Mix and Parsons; now it has also added the C. S. Johnson Co. of Champaign, Ill., to its roster, another of the Koehring family. C. G. Ortmayer heads the distributor firm. A. N. Luttermann is Secretary. R. R. Kelbe is Vice President and Sales Manager.



Here is Yancey Bros.' new plant at 1540 Northside Drive, N. W., Atlanta, Ga.

Moves Out of Path of Expressway

Yancey Bros. Co. moved on March 1 into its new plant at 1540 Northside Drive, N. W., Atlanta. For 21 years it had been on Whitehall Street, S. W., but the move was forced by the extension of Atlanta's new West Bypass Expressway, which will cut into Stewart

Avenue at the firm's old location.

The new plant is on a 15-acre tract of land and houses office, parts, shop, and service departments. Yancey's accounts include Caterpillar earth-moving equipment; Trackson, Hyster, and Athey attachments; Thew-Lorain

(Concluded on next page)



LOW BED TRAILER

MT SERIES

Covers All

TRANSPORTATION REQUIREMENTS

FROM

35 to 75

TONS

The Rugged new Dorsey MT Series Low Bed Machinery Trailers with four oscillating axles mounted on walking beams, distributing the load over sixteen tires . . .

Hydraulically operated air actuated brakes . . . eliminating brake rods and complicated braking system.

Simple construction provides ample margin of safety for loads exceeding rated capacity. Standard equipment includes many specially engineered items usually available only as "extras."

Converter dolly with quick detachable feature permits use as either semi or full trailer.

Dorsey Lowbeds Available in Capacities from 10 to 75 Tons

DORSEY TRAILERS

ELBA, ALABAMA



NEW, WHITE HALF TRACKS

Originally cost gov't \$7,000. Now priced at such a very small fraction of that figure. With International K11 motor, 4-speed trans. with auxiliary 2-speed shift and super power low speed drive. Hydraulic brakes, 300-20 tires. Excellent for logging, skidding, construction work, house moving, dump work. Available with or without winches. We carry a full line of replacement parts.

Millions of G. I. Truck Parts
Wilensky Auto Parts Company
1226 No. Wash. Ave. • Minneapolis, Minn.

Distributor Doings

(Continued from preceding page)

shovels, cranes, and draglines; Barber-Greene conveyors and asphalt plants; Buffalo-Springfield rollers; Cedarapids asphalt and rock-crushing plants; Rex pumps and concrete equipment; Chicago Pneumatic air compressors and tools; Disston power chain saws; and Rome disk harrows.

Goodloe H. Yancey founded the firm in 1913 and is its President. Don A. Yancey is Vice President. O. M. Huie is Secretary-Treasurer. There is a company branch in Augusta, Ga., and sales offices are in Macon, Rome, and Gainesville.

Wooldridge a Mack Dealer in West

Wooldridge Mfg. Co. of Sunnyvale, Calif., is to act as exclusive distributor in ten western states for off-highway vehicles made by Mack Mfg. Co. Wooldridge will also partially produce and fully assemble these vehicles in its California plant.

New Plant, New Products Show

Over 200 distributors from the United States and Canada attended the Frank G. Hough Co. "New Plant—New Products" show last January at Libertyville, Ill. The occasion was the completion of a building program that has doubled Hough's production capacity in a year. The new facilities include an assembly building; enlarged painting, parts, and material-storage facilities; and a one-story office building.

Distributors toured the plant and examined a display of the entire Payloader line of tractors and tractor-shovels, as well as other Hough material-handling and road-building products. At a dinner meeting they heard all about the company's plans for sales, advertising, and new products.

Scaffold Dealers Confer on Sales

At a 3-day conference last January in Cleveland, 30 distributors of Waco steel scaffolding met to discuss safer and better methods of scaffolding, new products and improved old products, the outlook in the construction industry, and selling and advertising in relation to that outlook. This was the second annual distributor sales confer-



Distributors of Waco steel scaffolding held a three-day sales conference last January in Cleveland. New methods, new products, and similar subjects were discussed.

ence held by Wilson-Albrecht Co., Inc., of Minneapolis. The company's Canadian licensee, Armson Iron Works of Windsor, Ontario, and its distributors were also present. A representative of the F. W. Dodge Corp. was on hand to give market data. The conference concluded with a trip to the factory in Elyria, Ohio.

Specializes in Engines

City Industrial Engine Sales, Inc., which was established last fall by Tom La Vorene, has opened its sales, parts, and service distributor facilities for Chrysler and International gas and diesel engines. The firm's one-story building is at Indiana Avenue and 23rd Street in the heart of Chicago's Motor Row. The business is devoted exclusively to engines and parts, power units, and allied items as used by the construction field and industry. Tom La Vorene is Vice President and General Manager. George Clarke is Service Manager. Harry Croessman heads up the Parts Department.

Handles Power Puller, California

Electric Steel Foundry Co. of San Francisco has been named by The Wyeth-Scott Co., Newark, Ohio, as distributor for its More Power Puller.

Government Needs Engineers

There is an urgent need for engineers to work in the Federal government in Washington, D. C., and vicinity. The Civil Service Commission in Washington is accepting applications now for these jobs, which pay from \$4,600 to \$6,400 a year.

To qualify for the Engineer examination, applicants must meet a basic requirement of appropriate college study

or experience or a combination of the two. In addition, they must have had professional engineering experience. Pertinent graduate study may be substituted for all or part of this professional experience. No written test will be given.

Information and application blanks may be secured from most first and second-class post offices, from Civil Service regional offices, and from the U. S. Civil Service Commission, Washington 25, D. C.

Corrosion-Resistant

Protective Coatings

Six coal-tar-base anticorrosive coatings for the protection of metals, wood, masonry, and insulation are produced by Continental Coatings Corp., 304 W. 44th St., New York 19, N. Y. They include Steelsaver, for ordinary corrosive conditions; Yankee Clipper, for marine equipment and shipping; Rockcoat, a heavy-duty anticorrosive coating providing protection from abrasives; Cermastic B-29, for extreme corrosive conditions; Concoat 75, an anticorrosive coating that resists extreme vibrations,

contractions, and expansions because of its plastic properties; and Concoat Aluminum, a protective decorative aluminum finish.

Continental coatings form a tough, elastic film designed to resist the penetration of chemicals, fumes, moisture, and heat. They are said to be nonsoluble in oil and completely waterproof. They may be dipped, sprayed, or brushed on. One, 5, and 55-gallon containers are available.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 824.

Ten 1951 Scholarships

To encourage future engineers to enter the fabricated structural-steel industry, the American Institute of Steel Construction will award 10 scholarships of \$1,000 each, this year, in American colleges and technical schools. To be eligible, a candidate must be proposed by the executive head of a member company of the Institute. A candidate need not be an employee, or the dependent of an employee, of the sponsoring company. But he must pursue the full course in civil engineering offered at any one of 125 colleges in the country. He is under no obligation to continue in the industry after graduation.

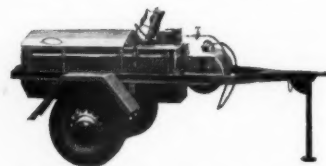
Thor Purchase in England

Independent Pneumatic Tool Co. Aurora, Ill., has bought Armstrong-Whitworth & Co., Pneumatic Tools Ltd., Gateshead-on-Tyne, England. The English firm now becomes an affiliate of Independent Pneumatic Tool Co. Ltd., in London, a subsidiary of the parent company. Robert G. Faverty, former Manager of Thor branches in Chicago and Detroit, is in Gateshead as Managing Director of the new Thor property.

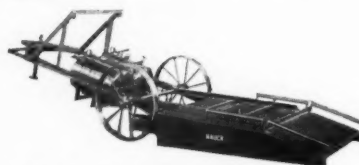
Preferred for their Performance

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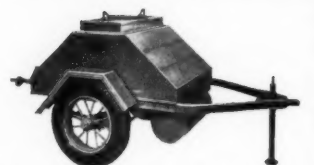
**HEATING
THAWING
MELTING**



Speed-Master Melting Kettle for tar, asphalt, pitch, 40 to 165 gal. sizes. Available also with hand or power spray attachments for applying bitumen under pressure.



Surface Heater—Fold-over type for easy transportation. 4 hood or pan sizes.



Tool and Asphalt Heater with 3 kerosene burners. Furnished with or without binder cement kettle.



Double Kerosene Burner Equipment on wheels for quick, portable service anywhere.



Compressed Air Oil Burner Equipment, heavy duty for heating, melting, drying, thawing.



Melting Furnaces for jointing compounds; also lead melting furnaces.



Superheated Steam Thawer with Injector Pump, for thawing hydrants and culverts.



Water Heater heats up to 1600 gal. water per hour for concrete heaters and central mixing plants.

**HAUCK
Oil Burning
EQUIPMENT**
for Construction
Maintenance • Repair

Write for
Catalogs

HAUCK MANUFACTURING CO.

116-126 Tenth St. • Brooklyn 15, N. Y.

INGERSOLL SHOVELS

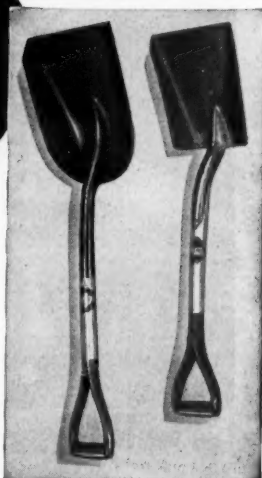
...Edges won't split or curl!

The Special Tillage Steel, known as TEM-CROSS, used in the manufacture of all Ingersoll Shovels, was developed in our own steel mills. By cross-rolling and special heat-treating, we give this steel an interlocking, mesh-grain structure that resists splitting.

Inquiries are invited
**INGERSOLL
STEEL DIVISION**
Borg-Warner Corporation
New Castle, Indiana

INGERSOLL SHOVELS
"A Borg-Warner Product"

We guarantee this if you
make sure to specify...
INGERSOLL SHOVELS



All Blade Finishes remain Black finish, except Shovels and Spades in Alloy, A and B Grades, which may be furnished with face polished and velvet back, or full polished.

New Materials Can Cut The Costs of Construction

In this short-of-war emergency, it is all the more important that we learn to use noncritical materials, and that engineers and architects work together to that end. This was the thesis of J. A. Murlin, of George L. Dahl, Dallas architectural and engineering firm, at a construction session of the 47th Annual Convention of the American Concrete Institute held in San Francisco in February.

Mr. Murlin described lightweight-concrete construction and its potentialities in reducing structural costs. If steel is the critical item on a project, it is possible, he said, to save steel by increasing floor-slab thickness with light-

weight concrete. This material also permits the use of the flat plate type of construction with much greater column spacing than is economical with ordinary concrete. Precast lightweight-concrete floor and roof joists also offer savings in framing costs. In a school building in Dallas, said Mr. Murlin, the saving amounted to almost a dollar per square foot in favor of lightweight precast joists.

There were other papers at the meeting. Myron A. Swayze, Director of Research, Lone Star Cement Corp., New York, recommended that finishing operations on concrete pavement be delayed until the concrete is close to its initial set, and that it be preceded by compaction of the upper portion of the slab. He also suggested that curing

water should not be added until the concrete has reached its maximum temperature and is beginning to cool. However, the surface must be protected from evaporation and from carbonation by contact with the air.

H. Walter Hughes, Associate Engineer, New York Department of Public Works, described special techniques in bonding, screeding, and finishing thin layers of concrete topping on concrete road slabs. H. H. Roberts, Chief Engineer, Consolidated Builders, Inc., Mill City, Oreg., explained the plant used at Detroit Dam for cooling the aggregate and cement used in the mass concrete. Professor Michael Goodman of the University of California, Berkeley, discussed unusual design and construction problems in architectural concrete.

Self-Loading Conveyor

The Model E-50 Loadmaster is described in a bulletin issued by Triangle Engineering Co., 2948 W. 26th St., Chicago, Ill., as a self-loading, self-propelled portable conveyor for use by contractors, material yards, concrete-batching plants, quarries, etc. Its compactness and mobility enable it to travel on highways without permit, the catalog says.

Other features and complete specifications of the unit are described. The Loadmaster has an overall width of 8 feet and rated capacity of 3 to 4 cubic yards per minute.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 769.

DISTRIBUTORS

ALABAMA—Tractor & Equipment Co., Inc., 4401 First Ave. N., Birmingham 1.

ARIZONA—Lively Equipment Co., Albuquerque, New Mexico.
State Tractor & Equipment Co., 407 S. 17th Ave., Phoenix.

ARKANSAS—Euclid-Memphis Sales, Inc., Memphis 2, Tennessee.

CALIFORNIA—The Euclid Road Machinery Co., 3710 San Pablo Ave., Emeryville.

COLORADO—Constructors Equipment Co., 3707 Downing St., Denver 5.

CONNECTICUT—The W. I. Clark Co., 2195 Dixwell Ave., New Haven.

DELAWARE—L. B. Smith, Inc., Camp Hill, Penna.

FLORIDA—Florida-Georgia Tractor Co., 2908 W. Beaver St., Jacksonville; 2413 State Road, Lakeland; 3139 No. Miami Avenue, Miami; 1400 S. Orange Blossom Trail, Orlando; New Quincy Highway, Tallahassee; 216 South 12th St., Tampa.

GEORGIA—Tri-State, Inc., 880 Glenwood Ave. S.E., Atlanta 1; East Side Highway, Macon.
Tri-State Tractor Co., 712-14 No. Washington St., Albany.

IDaho—Intermountain Equipment Co., Broadway at Myrtle St., Boise; 210 No. 4th St., Pocatello.

ILLINOIS—Euclid-Chicago Co., 6027 Northwest Highway, Chicago 31.
Euclid Sales & Service, Inc., St. Louis 10, Missouri.

INDIANA—Euclid-Chicago Co., Chicago 31, Illinois.
Reid-Holcomb Co., 1815 Kentucky Ave., Indianapolis 21.

IOWA—The Euclid Road Machinery Co., Hibbing, Minnesota.

Fehr Tractor & Equipment Co., Omaha 2, Nebraska.

KANSAS—The G. W. Van Keppel Co., Kansas City 8, Missouri.

KENTUCKY—Euclid-Kentucky, Inc., 3900 Crittenden Drive, Louisville.

LOUISIANA—Euclid-Memphis Sales, Inc., Memphis 2, Tennessee.

MAINE—Clark-Wilcox Company, Boston 34, Mass.

MARYLAND—Rish Equipment Co., Clarksburg, W. Va.; L. B. Smith, Inc., Camp Hill, Penna.

MASSACHUSETTS—Clark-Wilcox Co., 118 Western Ave., Boston 34.
The W. I. Clark Co., New Haven, Connecticut.

MICHIGAN—W. H. Anderson Co., Inc., 47 West Seven Mile Rd., Detroit 3.
The Euclid Road Machinery Co., Hibbing, Minnesota.

MINNESOTA—The Euclid Road Machinery Co., Highway 109 West, Hibbing.

MISSISSIPPI—Euclid-Memphis Sales, Inc., Memphis 2, Tennessee.

MISSOURI—Euclid Sales & Service, Inc., 5231 Manchester Ave., St. Louis 10.
The G. W. Van Keppel Co., 2440 Pennway, Kansas City 8.

MONTANA—Hall-Perry Machinery Co., P.O. Box 1367, Butte.

NEBRASKA—Constructors Equipment Co., Denver 5, Colorado.
Fehr Tractor & Equipment Co., 1809-11 Cumming St., Omaha 2.

NEVADA—The Euclid Road Machinery Co., Emeryville, California.
Faulger Equipment Co., Salt Lake City 8, Utah.

NEW HAMPSHIRE—Clark-Wilcox Co., Boston 34, Mass.

NEW JERSEY—L. B. Smith, Inc., Camp Hill, Penna.
Hubbard & Floyd, Inc., New York 51, N.Y.

NEW MEXICO—Lively Equipment Co., 2001 No. Fourth St., Albuquerque.

NEW YORK—Hubbard & Floyd, Inc., 131st St. & Gerard Ave., New York 53.
T. E. Potts Equipment Co., 2260 Sheridan Dr., Buffalo.

L. B. Smith, Inc., 357 W. Fayette St., Syracuse 2; 134 State St., Albany.

NORTH CAROLINA—Hampton Roads Tractor & Equipment Co., Norfolk, Virginia.

North Carolina Equipment Co., 2101 Hillsboro St., Raleigh; Pineville Rd., Charlotte; Swanton Creek Road, Asheville; P.O. Box 128, Guilford; P.O. Box 835, Wilmington.

NORTH DAKOTA—The Euclid Road Machinery Co., Hibbing, Minnesota.

OHIO—The W. W. Williams Co., 835 Goodale Blvd., Columbus 8; 18201 Brookpark Rd., Cleveland 11; 514 Main St., Cincinnati 2; 1260 Conant St., Toledo (Maumee).

OKLAHOMA—The Euclid Road Machinery Co., Dallas 1, Texas.

OREGON—Intermountain Equipment Co., Boise, Idaho.
P. L. Crooks & Co., 2145 N.W. Potteryville St., Portland.

PENNSYLVANIA—Atlas Equipment Corp., 635 Ridge Ave., Pittsburgh 12.
Standard Equipment Co., 152 Herton St., Wilkes-Barre; Meppurn & Lycoming Sts., Williamsport.

L. B. Smith, Inc., Camp Hill (Harrisburg); 29th & Montgomery Avenue, Philadelphia.

RHODE ISLAND—Clark-Wilcox Co., Boston 34, Mass.

SOUTH CAROLINA—Southern Equipment Sales Co., Sumter Highway, Columbia.

SOUTH DAKOTA—The Euclid Road Machinery Co., Hibbing, Minnesota.

TENNESSEE—Euclid-Memphis Sales, Inc., 185 E. Butler Ave., Memphis 2.
Power Equipment Co., 1218 Island Home Ave., Knoxville; 600 W. Manning St., Chattanooga.

TEXAS—The Euclid Road Machinery Co., 2924-26 Main St., Dallas 1.
Lively Equipment Co., Albuquerque, New Mexico.

UTAH—Faulger Equipment Co., 1361 So. 2nd West, Salt Lake City 8.

VERMONT—Clark-Wilcox Co., Boston 34, Mass.

VIRGINIA—Hampton Roads Tractor & Equipment Co., W. 38th and Kilham Ave., Norfolk.

Rish Equipment Co., 1603 Chamberlayne Ave., Richmond 10; 405 Center Ave. N.W., Roanoke 7.

WASHINGTON—A. H. Cox & Co., 1737 1st Ave. South, Seattle 4; 2015 Center St., Tacoma; 313 North Mission, Wenatchee.

P. L. Crooks & Co., Portland, Oregon.
Intermountain Equipment Co., E. 611 Sprague Ave., Spokane 5.

WEST VIRGINIA—Atlas Equipment Corp., Pittsburgh 12, Pennsylvania.

Rish Equipment Co., Kanawha Blvd., Charleston 22; East on U.S. 50, Clarksburg; P.O. Box 269, Bluefield.

L. B. Smith, Inc., Philadelphia, Penna.

WISCONSIN—Euclid-Chicago Co., Chicago 31, Illinois.
The Euclid Road Machinery Co., Hibbing, Minnesota.

WYOMING—Constructors Equipment Co., Denver 5,

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MORE PROFIT PER LOAD!**



Illustration at left shows a Euclid scraper dumping approximately 20 cu. yds. of fill material at Hickory airport in North Carolina. Powered by a 275 h.p. diesel engine, this scraper has a top speed loaded of 28.2 m.p.h.



Above, a Rear-Dump "Euc" places 22 tons of earth and rock fill during construction of Chief Joseph Dam at Bridgeport, Washington. Other Euclids of this type have capacities of 10 to 34 ton payload, 125 to 400 h.p.



Carrying a heaped load of about 18 cu. yds., this Bottom-Dump hauls overburden at a big open pit bauxite operation in Arkansas. Bottom-Dump "Eucs" are powered by engines of 190 to 300 h.p., have capacities of 13 to 50 cu. yds.

Engineered specifically for heavy off-the-highway hauling, Euclids are standard equipment on many construction and industrial jobs, quarry and open pit mining operations. Combining large capacity and high speed, "Eucs" haul more loads at less cost per load.

Continuous performance records on hundreds of the toughest jobs are evidence of the dependability and long life built into every Euclid. With payload capacities ranging from 10 to 34 tons or 6.6 to 50 cu. yds., there is a Euclid model for every type of job and material. Backed by a competent world wide distributor organization, Euclid equipment pays off in lower hauling costs.

Your Euclid Distributor will be glad to discuss the advantages of using Euclids for your off-the-highway hauling jobs. Call or write for information or a hauling cost estimate.

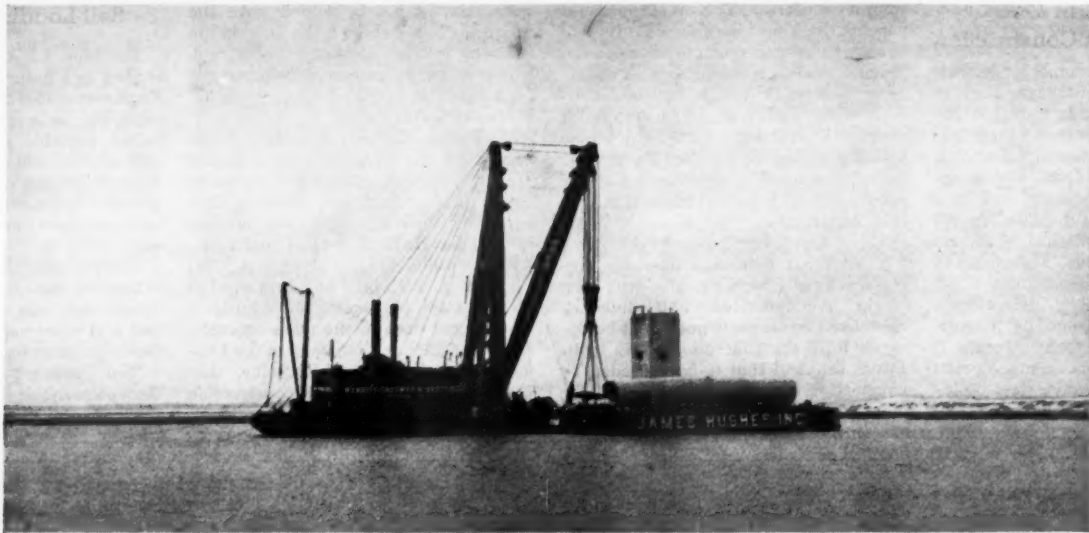
The EUCLID ROAD MACHINERY Co. CLEVELAND 17, OHIO



EUCLIDS



Move the Earth



Giant Floating Rig Places Sewer Outfall



The derrick Monarch tugs up Reynolds Channel toward the Atlantic Beach drawbridge and the job site beyond.

After a 9-Hour Trip, Derrick Monarch Lifts and Lowers a 200-Ton Concrete Chamber Onto Pile Cradle in Channel

• PLACING a 200-ton reinforced-concrete structure in tidal waters can be ticklish if controlling factors—wind, tide, and current—don't cooperate. Last February, Merritt-Chapman & Scott forces placed in Reynolds Channel a 3-story outfall chamber for Nassau County's new sewage-treatment works at Bay Park, Long Island, N. Y. Rains and high winds held up the job six days, but finally nature's elements keyed into the man-made plans.

The mammoth Monarch, largest commercial floating derrick on the eastern seaboard, had a 9-hour trip under tow through the New York Narrows, along the shoreline of the Atlantic, across the bar at Reynolds Channel, and through the 90-foot opening of a drawbridge, to the job site. The length of the trip and hazards along the way made it imperative that all factors be as favorable as possible. Careful planning and coordination by M-C&S crews enabled the takeoff and completion of the job in one day.

(Continued on next page)



With the derrick anchored, the barge on which the outfall chamber was built is moved alongside; pipe balances the chamber.



The Monarch takes the full 200-ton load of the reinforced-concrete chamber off the barge, and shows a list that puts the starboard gunwale a few inches from the water's surface.



Divers go below to bolt the chamber to the 12 x 12 timber-pile caps of the cradle on the bottom of Reynolds Channel.

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Chamber

The 200-ton effluent chamber, built on a barge near the site, is 29 feet high, 15 feet long, and 13½ feet wide. It has 2-foot reinforced-concrete walls for the lower 15 feet, and 15-inch walls above. Openings include an inspection man-hole at the top, one 4 x 5-foot and two 3 x 3-foot effluent openings, and an 84-inch-diameter pipe joint built into the base. The chamber terminates a 12,600-foot outfall line running through a 22-foot trench from the Bay Park plant to Reynolds Channel. With effluent escape openings set midway up three of its sides, the chamber is designed to keep the pipeline outlet from being clogged or otherwise damaged.

The plan of operation was to bring the Monarch on site during slack tide, move the barge supporting the chamber directly over the pile bents, raise the chamber, tug the barge off site, and carefully lower the structure on line.

Job Method

Waters were still choppy the morning



C. & E. M. Photo

Left to right are Jim Surprenant, Job Engineer; Paul James, Field Engineer; Bill Moulton, General Superintendent; and Ed Brause, Public Relations Director of Merritt-Chapman & Scott, on the sewer-outfall job at Bay Park, Long Island.

the Monarch shoved off for the job site. She left her berth at 3 a. m. powered by two heavy-duty tugs. Crossing the bar was uneventful, as was passing through the Atlantic Beach bridge, due to careful planning by her skipper, Pete Mikkelsen. She anchored down 350 feet off shore while the tugs nudged the chamber barge alongside. Surveyors on shore gave the preliminary positioning of the structure so that the booming and anchor tightening would be kept to a minimum during the drop.

Mikkelsen ordered the boom swung over to full starboard and the falls were lowered to pick up the spreader. The spreader was diagonally braced timber construction, designed to help equalize the load on each of the 4 wire-rope slings.

The chamber has four 1-inch rods running vertically through each of the corners, in addition to standard "in-use" reinforcing. These are tied in at the base and welded to the lifting irons at the top. They were more than sufficient to take the full load.

When all was secure, the mainfall and sidefalls were tightened and the Monarch slowly raised the structure from the barge deck. As the weight was transferred, the derrick slowly heeled over until the gunwale was a few inches above the surface. The barge was quickly towed out of the way, and while the Monarch was making the slow steady drop, the divers' rig was brought alongside.

Divers went overside while the Monarch held the chamber a few inches above the cradle of pile bents. The cradle consists of twelve 12-inch timber piles in three rows of four each, driven 20 feet into the channel bottom, with eight 12 x 12's which rest on the caps.

Paul James, M-C&S Field Engineer, stood on top of the chamber and relayed wig-wag directions from the transmitters on shore to Bill Moulton, General Superintendent, and the derrick captain, while the divers made certain that all was secure below. After a few adjustments in position, the drop signal was given and the chamber came to rest on its supports. The 3-foot 1½-inch-diameter bolts were shoved home

and all was made secure.

The top of the outfall chamber will always be exposed, with 6½ of its 29 feet above the surface at mean high tide. Divers will later link its intake joint with the last sections of the 84-inch inner-diameter outfall line. The last step in the project will be back-filling the excavation around the chamber, firmly embedding it in the channel bottom.

Details of the Monarch

Mikkelsen was pleased to talk about the Monarch after the job was done. "She's 155 feet long, 50 feet wide, and has normal draft of 7½ feet", he said. "The frame, boom, and machinery were built in 1894. The steel hull is new, though, built in 1927. Channel members throughout, compartmented sections, and three 80-ton ballast tanks are some of the features," he said with pride.

The Monarch has a steel-lattice A-frame with twenty 1½-inch wire-rope stays. The 98-foot boom is built

(Concluded on next page)

COMMENT

from the
BUTLER ENGINEER

April, 1951.

Of Several Things— Including FIRE

What's a fireproof building? Here's the best definition I've heard: "One that burns with a bright blue flame." . . . How fireproof is any Ready Mixed Concrete Plant? Or Roadbuilder's Plant? The answer's in the form of another question. What materials or equipment in the plant could cause a flash fire? A gas engine perhaps. Gasoline or oil in storage. Wood platforms. Wood siding . . . Think it over, because when you have a sudden 4-11 roarer concentrated against loaded structural steel—brother, get fire insurance—beforehand! I've seen it happen.

Butler Bin families are prolific. Wait a minute. What I mean is that people who install Butler Plants order more—strictly Butler—when their operations expand. Quintuplets aren't unusual. Triplets are common. Septuplets quite often occur. Names of the happy families on request. No room to print 'em. Two things, however, are pretty evident. The profitable efficiency of Butler Engineered Design leads to expansion. And there's no net worth-control for one who joins the Butler Bin family.

I attended the Ready Mixed Convention at New Orleans. Ready mixed concrete, I'm speaking of—not the already-mixed Floras and fauns around the bars . . . A woman's ready-to-wear shop next to the Roosevelt displayed bras and panties. That's not unusual, but worked prominently into the fabric was the silhouette of a hand. Masculine, if I'm any judge. Come to think of it, how unusual is that? I really wouldn't know. I'm a structural engineer—but I confine myself to steel.

I'll be back 'long about June.

The Butler Engineer

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951 BLACKSTONE AVENUE
WAUKESHA, WISCONSIN

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Literature describing remarkable features of the new ROGERS Power-Lift Detachable Gooseneck Trailer will be sent upon your request; but—more than that—any Rogers Dealer will demonstrate its features, right on your own desk with an operating scale model.

Contact him—see how easily it detaches—how the deck can be raised or lowered to avoid unloading and detouring under certain conditions—how disabled, non-powered equipment can be loaded easily—how the design provides giant tires for extra heavy and profitable payloads.

To buy a trailer without seeing this Rogers unit would be like going to the circus without seeing the elephant. Don't do it.

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Engine, belt, and electric driven pumps with many new features to give you outstanding performance at low cost. A.G.C. rated. Write for special bulletin.

RICE PUMP & MACHINE COMPANY
220 N. Milwaukee St. Grafton, Wis.

Giant Floating Rig Places Sewer Outfall

(Continued from preceding page)

to lift on the starboard only. The 150-ton-lift mainfall combined with two sidefalls gave the Monarch a total lifting capacity of 250 tons. The boomfall

and mainfall each have a 12-part 1½-inch line. The two sidefalls have 6-part 1¼-inch lines.

"See that equalizer up there," Mikkelsen said. "That assures all falls pulling together. The mainfall block weighs 7 tons, and I guess that's about all there is to this veteran rig. Unless you'd like to see the galley and have

a hot cup of coffee." We all went.

Supervising personnel, in addition to those already mentioned, included Jim Surprenant, Job Engineer for M-C&S Corp.; and Russell B. Fuller, Project Engineer, and Milton Ward, Field Engineer, for the County's forces.

Excavator, Roller Catalogs

Two new catalogs, one on the Hystaway excavator-crane and the other on the Grid Roller, have been issued by the Hyster Co., 2902 N. E. Clackamas St., Portland 8, Oreg.

The 16-page Hystaway catalog illustrates the five-in-one machine, described as both a utility and a production tool for mounting on Caterpillar track-type tractors. Components are the shovel, dragline, crane, backhoe, and clamshell, each of which is pictured and described separately. The catalog covers mounting procedure, complete specifications, dimensions, and optional equipment and attachments; these last include Esco track-walking shoes to permit the Hystaway tractor mount to operate on or off railroad tracks.

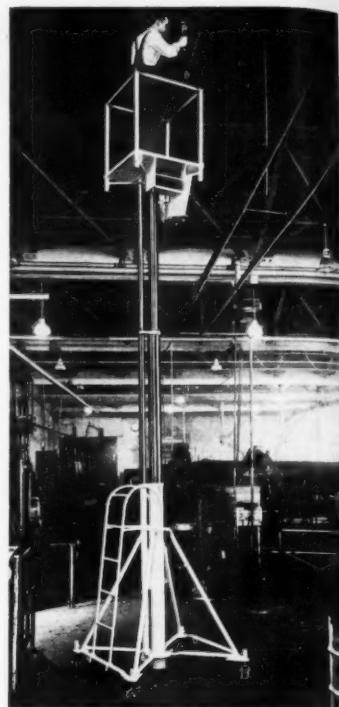
The other bulletin shows practical applications of the Grid Roller on highway salvage jobs throughout the country. It describes its operation, towed by either a Caterpillar motor grader or a Caterpillar tractor, depending on grades. And it discusses drums, grids, and weight factors.

This literature may be obtained from the company by requesting Bulletin No. 1170 for the Hystaway and Bulletin No. 1175 for the Grid Roller, or by using the Request Card at page 16. Circle No. 770 or 775 respectively.

Literature on Belting

A 4-page folder describing various types of heavy-duty belting for conveyor and elevator service has been offered by Hamilton Rubber Mfg. Corp., Trenton 3, N. J. It provides a brief description, specifications, and cross-section illustrations of the products manufactured by the firm. Specially designed belts to carry abrasive material, oily or hot material, and bulk materials are included. Twelve different types of belts are described and some of their applications are illustrated with a number of on-the-job photographs.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 745.



Controlled by a foot-operated lever on the platform, the electro-hydraulic Moto-Lift work tower can be raised to a 17-foot level or telescoped to clear doors 7 feet high.

Mobile Work Tower Has Platform Control

A new electro-hydraulic work tower has been developed by Safway Steel Products, Inc., 6234 W. State St., Milwaukee 13, Wis., for a variety of maintenance jobs in the shop or field. Battery-powered, the unit requires no electric connections. Controlled by a foot-operated lever on the platform, it may be quickly raised to a 17-foot level or telescoped to clear doors 7 feet high.

The Safway Moto-Lift stands on a base measuring 51 inches square. This may be telescoped to permit passage through 30-inch-wide doors. To permit moving the tower readily, swiveling 5-inch casters with rubber tires are located at each corner of the base. A safety brake on each caster locks both wheel and swivel in any working position.

Further information on the Safway Moto-Lift may be secured from the company. Or use the Request Card at page 16. Circle No. 787.

Corrosion Protection

A new method of cold-galvanizing for surface protection of steel and iron has been announced by Chase Chemical Corp., 40 W. 29th St., New York 1, N. Y. Extensive testing, says Chase, has shown that the process has widely diversified applications and may be used effectively on any structure from the highest iron or steel bridge down to a rusted auto fender. Utilizing Zinkrich cold-galvanizing compound, applied with an ordinary paint brush, electric spray gun, or cold dip, it requires no special equipment or personnel training.

Zinkrich, when applied to steel or iron surfaces, creates an electro-chemical union, thus allowing zinc to become galvanized to the base metal's surface. Zinkrich combines with the steel or iron to produce electrical continuity and leaves a coating of 96 parts by weight of chemically pure zinc, Chase reports. In cases where it is applied directly onto adhering rust, it induces the rusted area to create its own protective non-flaking coating, arresting further rust and preventing "rust creep".

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 765.



perfect measurement

Rough "approximations" won't serve an architect, engineer or contractor in the serious business of estimating concrete or determining the proper mixing capacity of a drum.

You want to know instantly, exactly and in precise units of measurement. And you can know, simply by reading the AGC Rating Plate on all standard mixers and pavers.



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THE JAEGER MACHINE CO.
Columbus, Ohio

THE KNICKERBOCKER CO.
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KOEHNING COMPANY
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KWIK-MIX COMPANY
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THE T. L. SMITH COMPANY
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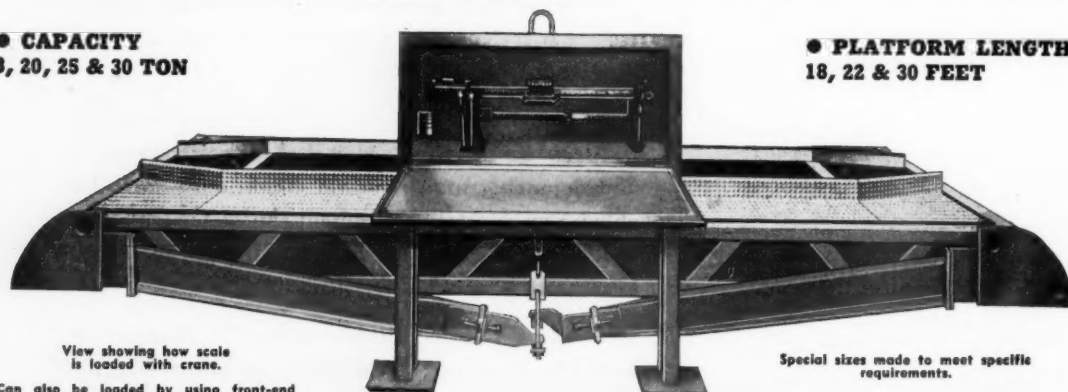
WORTHINGTON PUMP & MACHINERY CORP.
Ransome Division, Dunellen, N. J.



THURMAN Portable TRUCK SCALE

● CAPACITY
8, 20, 25 & 30 TON

● PLATFORM LENGTHS
18, 22 & 30 FEET



View showing how scale is loaded with crane.

Can also be loaded by using front-end loader or winch.

Special sizes made to meet specific requirements.

THE THURMAN PORTABLE TRUCK SCALE can be moved from job to job by removing 6 nuts which hold side arms in place. The rest of the scale can be lifted as a unit. Scale can be moved and readied for use in a few minutes as no adjustments are necessary.

EXTRA LARGE STEEL BASES support the scale, thus requiring no concrete footings. Scale furnished with baked enamel weighbeam—other vital parts are electro-plated to prevent rust and corrosion.

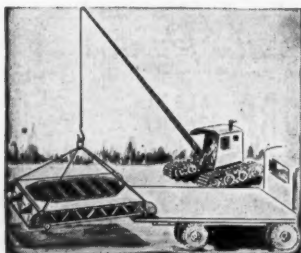
Write for information on other types including wheelbarrow scales, batching scales, and pit-type truck scales.

THURMAN SCALE DIVISION

156 NORTH FIFTH STREET

COLUMBUS 15, OHIO

ESTABLISHED 1918



Construction's Role In Civilian Defense

(Continued from page 3)

recommendations for fitting the resources of the construction industry into the civil-defense plan.

In the event of bombing disaster, it will insure the greatest speed and efficiency if, in every potential target area or community, a general construction contractor of recognized engineering and executive ability has been selected as coordinator or general supervisor of all contractor construction forces for that area. The AGC suggests that these coordinators be recommended to the civil-defense authorities by the contractors themselves, since they know best the capacity and performance record of the local members of the construction fraternity.

At least one and preferably two deputy coordinators or supervisors should be selected in the same manner, to assist the coordinator or serve in his place should he be absent or incapacitated at the time of an emergency.

The coordinator and his deputies should be supplied with a complete roster of the construction contractors in the community, with detailed information about the equipment and personnel and the type of work normally performed by each one.

If there is a local association of contractors, the AGC advises that the manager or secretary be appointed as liaison officer, since his knowledge of all the contractors and their capacities should be invaluable to the coordinator and his deputies. If there is no contractors' association in the locality, contractors should select someone—a contractor or an equipment dealer—who is sufficiently acquainted with them to know their capabilities and resources.

In addition, the coordinator should have complete information on the ability, personnel, and equipment in nearby communities, so that those forces could be mobilized quickly in case of major disaster.

It is recommended that a contractor's forces be assigned as a unit. Contractors' forces are accustomed to work together, and instructions given rapidly and under stress could be more readily understood and efficiently carried out if each contractor organization worked as a team or teams.

Equipment Availability

The number, type, and makeup of equipment units needed to meet the emergencies of clearance, rescue, demolition, etc. should be established for each area. In this, an inventory of available construction equipment and trained operators is invaluable. It should include not only contractor-owned equipment but also stocks of equipment and parts on hand at equipment distributors.

Steps to set up such equipment inventories have been taken in a number

of places. For example, the Wisconsin Road Builders' Association, working with the state civil-defense authorities, has completed a detailed inventory of all equipment owned by its members. This inventory, which includes the location of each piece of equipment, is currently revised so that at any given time the defense authorities know the types and approximate number of pieces of equipment in any locality. This equipment can be made available for civil defense at a moment's notice.

Similar procedures have been worked out by the Michigan Road Builders' Association in cooperation with the State Civil Defense Director, in New York City, and elsewhere.

Training Construction Units

The first step in organizing and training contractors' forces is to establish general specifications for the various units needed, so that assignments can be made to contractors. These units would handle immediate clearance, demolition, and follow-up clearance and cleanup. Such work would require superintendents, foremen, equipment operators, and workmen.

For clearance, rescue, and demolition, the equipment needed would include equipment trailers, in all sizes, with hauling tractors; all sizes of tractors with accessories and attachments; bulldozers; front-end loaders; mobile cranes and shovels; wrecking trucks with winches; cutting torches with supplies of gas; portable floodlights; air compressors and pneumatic tools; jacks; power saws; log chains and cable slings; mobile fuel and lubricating units; and mobile repair units.

Final cleanup would need, in addition, power shovels and cranes, scrapers, motor graders, pumps, and backfillers.

Personnel training would be primarily for executive and supervisory personnel to acquaint them with the plan of the Civil Defense Engineering Service and to establish the relationship with the other services. The organization, the efficient operation of equipment, and the know-how for tackling such jobs are already the contractor's stock in trade, and constitute his great contribution to the program.

Engineers' Role

One of the first tasks after any disaster is to determine immediately what

structures or parts thereof are unsafe for occupancy, or hazardous due to liability of partial or complete collapse. Therefore a damage survey must precede or at least accompany any demolition or clearance units.

Here civil engineers can perform a signal service. Each Damage Survey

Team should be comprised of at least three qualified and experienced structural or civil engineers.

Keeping Highways Open

Since none of the units can function unless the streets and highways are

(Concluded on next page)

HERE IS THE MACHINE THAT HAS REVOLUTIONIZED CONCRETE SAWING

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Hayward Buckets

Construction's Role In Civilian Defense

(Continued from preceding page)

open, upon the highway and street departments rests the tremendous responsibility of clearing and repairing highways and bridges as fast as is humanly possible.

Most highway departments have some type of plan to meet emergencies such as floods, hurricanes, and similar disasters. Now they are expanding their plans as necessary to cope with the additional problems and hazards of attack by air.

Virginia, for example—in a critical location because of its proximity to the nation's capital—has already set about establishing a plan of action. Its basic purpose is to have mobile highly trained groups throughout the state ready to move into any area where roads or bridges are damaged and highway transportation is impeded. Heading the Disaster Committee is A.

H. Pettigrew, Right-of-Way Engineer, and included are the Assistant Chief Engineer, the Maintenance Engineer, and the Equipment Engineer. Disaster teams, under the direction of the District Engineer, will be established in each district. The emergency teams will include mechanical, bridge, district road-repair, and residency road-repair crews.

Close liaison will be maintained with the State Police, a member of whose staff serves as an ex-officio member of the Disaster Committee. Local State Police officers are ex-officio members of the committees in each district.

Most state highway departments have fairly complete information on the road contractors in their state, many of whom have served effectively in the past when severe storms, floods, or hurricanes threatened to cripple highway transportation. It should therefore be a simple matter to expand this cooperation as required to fit into the civil-defense program.

It is important, however, for contractors working with civil-defense authorities to have established which agency will have first call on their equipment and personnel. Contractors on whom the highway department is counting should not also be assigned

to other civil-defense units, except as auxiliaries if not needed for road work.

New York City's Plan

As an example of how the construction industry can cooperate in preparing for civil defense, let's take a look at New York City's setup.

One of the several divisions of the Office of Civil Defense is the Public Works Emergency Division, directed by Frederick H. Zurmuhlen, Commissioner of Public Works, with Eugene M. Itjen, Engineering Executive Assistant to the Commissioner, serving as Coordinator. The PWED's responsibilities include clearance of debris; demolition; emergency shut-off of broken utility lines; heavy rescue work; repair of streets, sewers, and utilities; design and construction of authorized public shelters; illumination control; and decontamination. Working with the PWED, of course, are various city departments, and in addition utility companies, private contractors, equipment - rental companies, equipment and material suppliers, and architects and engineers.

Director Zurmuhlen has several deputy directors. One of these, representing the contractors of the Metropolitan area, is Fred J. Driscoll, President of the George F. Driscoll Co., recently

elected President of the Building Trades Employers' Association.

One of the first steps in organizing the PWED was the enrollment of contractors and their personnel and equipment. With the cooperation of the General Contractors' Association, the Building Trades Employers' Association, The Moles, the Building Congress, Metropolitan Builders' Association, and the Public Building Contractors' Association, letters were sent to all their members requesting complete information on the company, location of its equipment yards, company officials, key employees (including engineers, superintendents, master mechanics, foremen, etc.), all equipment owned by the company, and its location.

This information is being tabulated on IBM cards, and a plan has been set up whereby it will be kept up to date as to location of personnel and equipment. Similar information on equipment operators and construction workers is being compiled with the cooperation of the local labor unions.

It is the plan to make contractors' equipment yards mobilization points, to which personnel would report in case of disaster. Insofar as possible, contractors' forces would work as units under their own supervisors.

With the enrollment of contractors well under way, work has now been started on enrolling and inventorying the personnel and equipment of equipment-rental companies and suppliers. Architects and engineers are being asked to volunteer as individuals, and such firms will be enrolled as auxiliary consulting and planning groups in the PWED.

Common-Sense Preparedness

In anticipating and preparing for such disasters, we must, CONTRACTORS AND ENGINEERS MONTHLY believes, aim for the middle ground of moderation and good sense, avoiding the one extreme of panic, constant anxiety, and resulting ulcers, and the other equally dangerous extreme of public indifference. It would be folly to go so "all out" for civil defense that we overspend ourselves, our money, and our resources, with ultimate destruction of the nation's economy. It would be equally foolish to ignore the dangers and make no preparation or plans to minimize the effects of attack if they become an actuality.

To contractors and engineers, planning and organizing to meet emergencies is nothing new; it's part of good job management. That same kind of practical hard-headed realism, along with the experience, resources, and capacities of the construction industry, is needed in the civil-defense program.

Combination Shovel: Overhead and Front-End

A new 8-page bulletin about the Lodover, a 1-yard combination overhead loader and front-end shovel for International T-9 and TD-9 tractors, has been released by the Manufacturing Division of Service Supply Corp., Philadelphia 32, Pa. It highlights the ability of the Lodover to perform high-speed front-end loading where desired, or overhead loading to eliminate tractor turns.

Special emphasis is given to the new design features which enable the Lodover to fill completely its 1-yard bucket. Balanced frame design, hydraulically controlled down pressure, and positive bucket control are some of the illustrated features. Attachments available for use with the Lodover include a bulldozer blade, angle blade, Plexiglas cab, rear-mounted winch, lift forks, and a 5-ton Lodover boom. Complete specifications and dimensions of the unit are included in the catalog.

This literature may be obtained from the company by requesting Bulletin LO 200, or by using the Request Card at page 16. Circle No. 832.



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Trusses Give Store A Clear Floor Area

Modern One-Story Building in Chicago Has a Structural Framework with Concrete Foundation and Floor Slabs

(Photo on Page 1)

• GOLDBLATT Brothers, Inc., has added another store to its list of Chicago branches with the construction of an ultramodern one-story building at the southeast corner of West Madison Street and Pulaski Road. This is the firm's tenth branch store to the main emporium on South State Street. It is also the largest, having a frontage of 467 feet on West Madison and 125 feet on Pulaski. The store features a main-floor selling area unobstructed by pillars, with the roof supported by steel trusses. The foundation and floor slabs are reinforced-concrete.

Inland Construction, Inc., of Chicago was the general contractor, while Friedman, Alschuler & Sincere, also of Chicago, was the architect and engineer. Construction got under way on April 1, 1950, and the store was ready for business by March 1 of this year. It was built at a cost of approximately \$1,500,000, and has 120,000 square feet of floor space distributed over the basement, first floor, and penthouse at the rear of the building. The building is air-conditioned the year round to maintain the optimum temperature and humidity levels; a filtering system keeps air in the store free from dust and smoke. Fluorescent lighting is used throughout.

On the exterior, the walls around the large show windows on the two street fronts are of polished granite and Indiana limestone. On the other two sides the walls are common brick, 13 inches thick. Over the main entrance at the street corner is an electric clock measuring 37 x 30 feet, mounted on a steel framework; its hands and numerals are neon lights. Along the two street fronts a lighted steel canopy is cantilevered 10 feet out from the building to protect shoppers in bad weather.

Excavation and Foundation

Before construction started, six old buildings on the site were razed to

make room for the new store. While this was going on, excavation got under way at the extreme eastern end of the lot which had formerly been used for parking cars. Incidentally, some time in the future an old car barn on West Madison Street across from the store will be torn down to provide parking space for the cars of customers using the store. Lindahl Brothers of Chicago handled the excavation, digging a hole over the site to an average depth of 15 feet below grade.

The excavation totaled 38,000 cubic yards of material, mostly a hard clay, which was removed by a 1-yard shovel and hauled away in a fleet of trucks. The digging was uneventful until a lone granite boulder was encountered that measured 20 x 10 x 10 feet in volume. This massive chunk of rock in the ground had not interfered with the shallow foundations of the old buildings on the site when they were erected some 50 years ago. But the boulder had to come out to make way for the large store. Blasting was out of the question because of nearby water mains and adjoining buildings in the congested business district. Accordingly the job was turned over to the Chicago Concrete Breaking Co., which broke up the hard granite formation into small pieces by drilling holes and then driving wedges to chip off the stone bit by bit.

Along the west side of the hole fronting on Pulaski Road, interlocking 12-gage corrugated-metal sheeting, 18 feet long, was driven to support the side of the excavation. This row of sheeting also served as a form for the foundation-wall pour. On the long West Madison Street side, and the paralleling alley at the rear of the site, timber sheeting was used. The timber consisted of 3 x 12's, 18 feet long, which extended to a depth of 2 feet below the bottom of the foundation wall. All the driving was done with an air hammer, and the sheeting was strengthened with double 12 x 12 wales about 6 feet apart.



C. & E. M. Photo

On the first-floor slab of the new store building for Goldblatt Brothers, Inc., in Chicago, a DeWalt 14-inch-blade table saw cuts forms to shape.

The bracing consisted of 10 x 10 drums or shores on 8-foot centers, with their upper ends at the two-thirds height level of the walls. They were left in place until both the basement and first-floor slabs were poured.

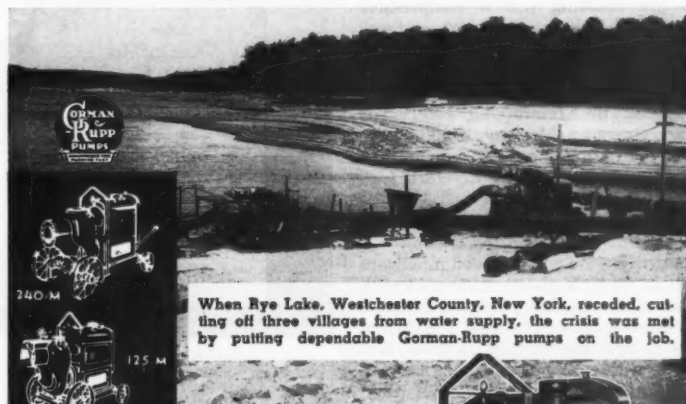
Concrete Footings

Concrete footings are fairly evenly

spaced—on 27-foot centers east and west, or along the West Madison side, and on 25-foot 10-inch centers north and south, or along the Pulaski side. They vary in size from 6 feet 6 inches square to 11 feet square, with their maximum depth being 2 feet 3 inches. Holes were opened in the ground with

(Continued on next page)

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Trusses Give Store A Clear Floor Area

(Continued from preceding page)

pneumatic spades, and the sides of the cuts served as forms for the pours. The soil pressure in this area is 4,000 pounds per square foot.

The footings support reinforced-concrete columns which extend from the basement up to the first-floor level. Around the perimeter of the structure is a 13-inch RC wall which also extends from the basement to the first floor. Footings, columns, and foundation walls were of course poured first, followed by the first-floor slab and then the basement slab. By getting the first-floor slab done first, the contractor was able to proceed with several other phases of the construction, leaving the basement pour to be done at various periods as time permitted.

The basement floor is a 6-inch slab covered with a ¾-inch mortar topping whose grade elevation is 10 feet 0 inches. With that grade as a datum, the first floor is at 24 feet 9 inches; the roof at 46 feet 2½ inches; and the penthouse roof at 61 feet 2½ inches. All concrete for the building has a compressive strength of 3,000 psi at 28 days, and was supplied ready-mixed to the job by the Materials Service Corp. of Chicago. Concrete Steel Co., also of Chicago, furnished the reinforcing steel. The latter company likewise supplied the steel pan forms used in pouring the first-floor slab. Gateway Erectors, Inc., installed the forms.

Formwork

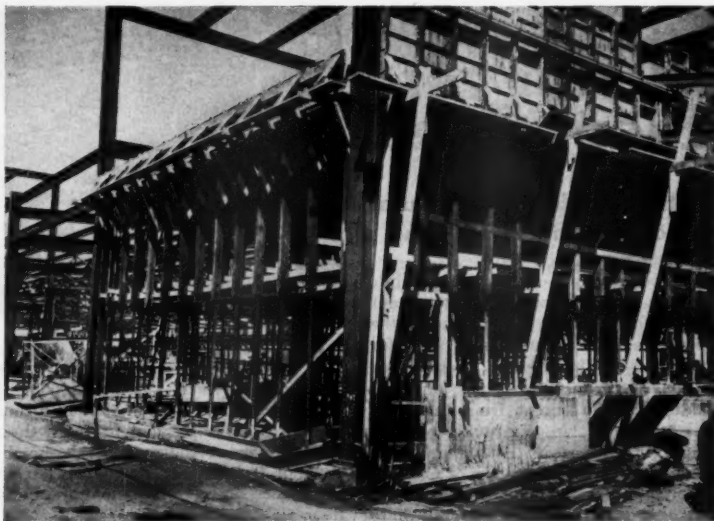
Forms for the concrete columns were built of ¾-inch plywood secured with Symons column clamps. The wall forms were built up of Symons 2 x 8-foot panels, held together by Symons ties. To speed the carpentry work a DeWalt 14-inch-blade table saw was set up on the first-floor level. The metal forms for the first-floor pour support a 3½-inch slab, with joists on 20-inch centers increasing the depth to 15 inches; the haunches are 6 inches wide x 12 inches deep. The first floor is designed for a load of 100 pounds to the square foot. Interior and spandrel beams are as large as 24 inches wide x 40 inches deep.

On the wall pours the concrete was chuted directly into the forms from the truck mixers. For the basement slab the concrete was discharged into a hopper that fed three Scootcrete power buggies distributing the concrete to the forms. This operation was simplified in pouring the first-floor slab by discharging the transit-mix concrete directly into the Scootcrete machines. Water and paper were used in curing the concrete.

The floor slabs are reinforced with steel mesh, and also contain a Nepco duct distribution system for conduits and wiring. Wire ties were embedded in the bottom of the first-floor slab to support the hung ceiling in the basement. In order not to hold up the truck mixers, concrete for the fireproof encasement of the steel columns was mixed on the job in a CMC 2-bag mixer. The encasement has a 2-inch thickness, and was poured within wooden forms. Air-conditioning and boiler equipment is housed in the penthouse or second story, a narrow wing at the rear of the building. Forms for this slab pour were supported on Symons shores. Concrete was raised to this level with a Stampco Tugger hoist tower.

Steel Erection

Structural steel for the store, totaling 483 tons, was furnished and erected by the American Bridge Co. The material was delivered from the Gary, Indiana, plant by truck, and unloaded at the job site by a 20-ton Manitowoc Speedcrane on crawler treads, and equipped with a



C. & E. M. Photo

The section of the store along the alley at the rear, where a second floor will hold boiler equipment. Forms for this slab pour are supported on Symons shores.

75-foot boom and 20-foot jib. A hired truck crane with a 60-foot boom and 30-foot jib was also used for unloading and erecting the steel. Both these operations were hampered considerably by the overhead trolley wires that are strung along both streets, entailing great care by the crane operators to keep their rigs from getting fouled up in the cramped working quarters.

Along the sides of the building are 12-inch H-columns to support the 18 trusses running north and south. They are 103 feet 11 inches long, 4 feet 1½ inches deep at the sides, and 10 feet 5½ inches at the center. Their average spacing over most of the building is 27 feet, with the spacing closer together near the ends. Vertical clearance under the trusses is 16 feet. The bay along the rear of the store adjoining the truss section is 19 feet 1 inch wide, two stories high, and topped by a flat roof. On the first floor this area is given over to fitting, alteration, and stockrooms, while the second floor houses the heat-

(Concluded on next page)

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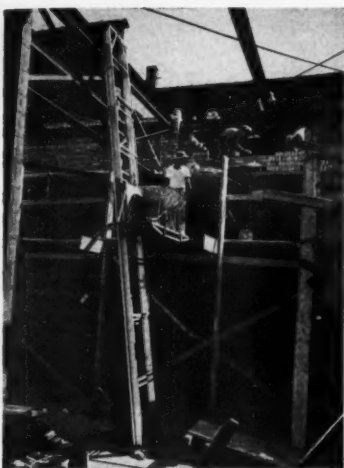
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C. & E. M. Photo

Bricklayers work on Universal scaffolds and one man wheels mortar off a Lad-E-Vator. Ruby Construction Co. held a subcontract for the bricklaying portion of the project.

ing and air-conditioning machinery. Steel erecting proceeded from east to west down the length of the building, beginning July 11 and finishing August 16. Naturally the heavy cranes could not operate over the newly poured first-floor slab in raising the heavy trusses, so timber cribbing was built up directly over the location of the concrete columns in the basement. Across these went other timbers to support 33-inch H-beams which ran down the center of the structure to serve as rails for the crane to run over. In this way the weight of the heavy machine was transferred through the columns to the foundation footings.

The American Bridge Co. employed three riveting crews on the steel work, putting in approximately 10,000 rivets— $\frac{3}{4}$ and $\frac{1}{2}$ -inch size—and 3,000 bolts. A single 210-cfm air compressor powered the Boyer 90 riveting hammers that were used.

Bricklaying

Bricklaying was done under a sub-



C. & E. M. Photo

Fred Pearson, at left, was Superintendent on the job for Inland Construction, Inc. Claude J. Easter was Superintendent for American Bridge Co. And Henry Ray was Engineer representing the architect.

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contract by the Ruby Construction Co. of Chicago, with the bulk of this work on the side wall adjoining a building to the east, and at the rear of the store where the 2-story portion is located. As the walls went up, the bricklayers worked from Universal scaffolds, while materials were raised to them on a Lad-E-Vator. In order to avoid the delivery of materials to the job in the congested streets, the alley at the rear of the store was used as much as possible. The alley serves as an access to the loading platform built into the southeast corner of the building.

Tack-welded to the purlins of the trusses is an 18-gage steel deck roof insulated with Celotex and covered with the conventional built-up material. The first-floor metal-lath and plaster ceiling is suspended from the trusses. Floors of the first-story sales area are magnesite terrazzo. Two escalators for the convenience of shoppers connect the basement and main street floor. The basement ceiling is Acoustone on rock-lath.

Personnel

Key personnel in the construction of the store included Fred Pearson, Superintendent for Inland Construction, Inc., the general contractor; Claude J. "Blackie" Easter, Superintendent for the American Bridge Co.; and Henry Ray, Field Engineer representing the architect.

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Relocated Highway Gets Hot-Mix Paving

Stiff Asphaltic Cement in Plant-Mix Pavement Handled by Madsen Asphalt Plant in Three Setups

• ASPHALTIC cement, 86-100 penetration, with hot-mix laydown courses only one inch thick, were two of the main sources of concern for Tom McCorkle Construction Co. of Boise, Idaho, recently. The company has worked two 2,000-pound-capacity Madsen asphalt plants. The first plant began operations on a 36-mile section of State Roads 2 and 2-F between Coulee City and Coulee Dam, Wash., during the latter part of July and the second plant during the middle of Sep-

tember. Adverse weather conditions caused the shutdown of both plants toward the latter part of November.

The work was divided into two contracts. On the first 21-mile section a total of 50,000 tons of plant-mix will be prepared and placed. There were 37,000 tons on the 15-mile second section. Approximately one mile of 1½-inch wearing course in the first contract and 6 miles in the second section remain to be finished under more favorable weather conditions this spring.



C. & E. M. Photo.

This is one of the two 2,000-pound-capacity Madsen asphalt plants McCorkle Construction Co. set up for its two hot-mix sections in Washington.

A general relocation of Secondary State Highway No. 2-F has been necessary to raise it up high enough so it will clear waters of the 27-mile-long equalizing reservoir now under construction by the U. S. Bureau of Reclamation. The Washington Department of Highways has administered the highway relocation contracts and will be reimbursed about \$4,000,000 by the USBR for the total cost of this work. Very heavy grading through a considerable amount of solid rock took two years under four other contracts. Peter Kiewit Sons' Co. and F. R. Hewett Co. produced and stockpiled the mineral aggregate for the hot-mix, so McCorkle's assignment was strictly paving.

The paving consists of 22 feet of hot-mix. Over part of the job the pavement was placed in a 1-inch leveling and 1½-inch wearing course. Over the balance, 1½-inch leveling and 1½-inch wearing courses were placed. The roadbed was built sufficiently wide so there are 6-foot shoulders on either side of the new pavement.

Three hot-plant setups were used. They divide the paving into approximately three equal portions.

Hot-Plant Setup

McCorkle used two 2,000-pound-capacity Madsen asphalt batch plants to prepare the hot-mix. The first plant was set up near Coulee City and later moved to the middle or Adair site (second contract), while the second Madsen plant was erected near Electric City or the northern end of the project. Appurtenant features of the first plant included a Cleaver-Brooks steam generator; a D4400 Caterpillar engine which ran the dryer; a D13000 Caterpillar engine driving the pugmill; four asphalt-storage tanks of 8,000, 7,000, 5,000 and 4,000-gallon capacity; and two fuel tanks of 5,000 and 3,500-gallon capacity. The second plant is of the same type with essentially the same basic setup.

The mineral aggregates consisted of crushed basalt and other volcanic-type gravel, which had been crushed and

stored at each setup site. A Lima ¾-yard dragline and a bulldozer at the first plant site, and an Allis-Chalmers HD-type bulldozer at the second setup, placed two sizes of this aggregate along with fine muck sand into the aggregate feeder. A cold-stone elevator moved the material from the feeder up to the plant dryers. As a general rule the rock was easy to dry, because sun and wind had worked a long time on the storage piles. The dry aggregate emerged from the dryer into a hot-stone elevator, was sent up to the two decks of Symons screens, and passed eventually into the weigh bins. The upper screen decks were covered with ¾ and 1-inch mesh, while the lower deck had ¾ x ¾-inch slotted screens.

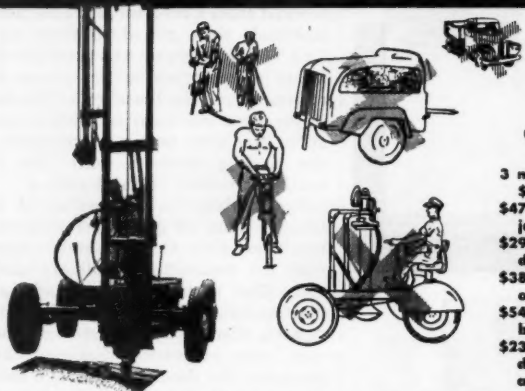
Asphalt cement was a Stancal Asphalt & Bitumuls Co. product and came from the Richmond Beach refinery near Seattle. The timing of shipments was unbelievably accurate. Fleetway Trucking Co. had the transportation contract, and used huge Kenworth trucks and trailers. Both the truck and trailer tanks hauled 5,450 gallons at a time, and they were so well insulated that heat losses of only 10 degrees per transport hour were reported. The asphalt left the refinery at 400 degrees and arrived on the job at 335 to 350.

Asphalt pumps on the transport units moved the material into the storage tanks, where it was kept hot by steam coils from the Cleaver-Brooks steam generators. The storage tanks were not insulated, however, and sometimes, to boost the heating, a Cleaver-Brooks retort was used. The asphalt went from storage to a 400-pound hot pot on the plants by means of a Worthington steam-driven asphalt pump.

To meet contract specifications, the spring asphalt scales were removed from the first plant and a new Yale gravity-balance dial scale was installed. The second plant was equipped, before being used on this work, with a single-beam Howe balance scale. The springless-type scales were required by the Washington standard specifications and insured accurate proportions of asphalt

(Continued on next page)

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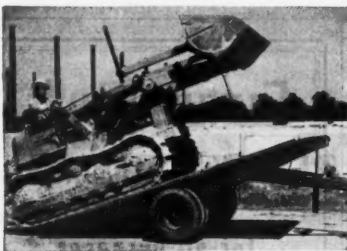
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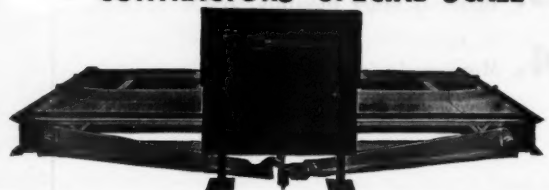


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cement in each batch.

A heavy fuel oil, PS-400, was used successfully in both the steam-atomized burners of the aggregate dryer and the steam generator. The fuel was preheated by steam, however, and the boiler feed water was also preheated before injectors admitted it into the combustion chambers.

Considerable thought went into the plant layouts, because adverse winds could have been nasty for everyone. Old-timers in the vicinity volunteered the information that prevailing winds traveled northeast, up the coulee, so the asphalt tanks and boilers were located on the leeward side of the plants. The setups worked fine, and 90 per cent of the time the wind blew smoke and dust away from the plants.

About 5 per cent of asphaltic cement was used in the mixture, and as a general rule the plants consistently turned out from 70 to 85 tons per hour with an occasional run of 100 tons an hour. The mixing time as set by the Washington Department of Highways was 30 seconds.

The plant crews consisted of a foreman, a fireman, pugmill operator, oiler, dragline operator, and 2 mechanics. The oiler on each plant also took care of oiling the 10 truck bodies once a shift. These were Fords, Chevrolets, and Diamond T's, mostly company-owned. They hauled from 8 to 9 batches at a trip. Occasional loads were weighed to check the 2,000-pound batch, but for the most part inspectors figured the batch weights were accurate.

Paving Goes Fast

Paving proceeded rapidly, and local residents around Coulee City were amazed to see how fast the smooth black ribbon unfolded; 85 tons an hour will go a long way when the leveling course is only one inch thick, compacted.

Both courses were completed for each setup by taking first an 11-foot leveling-course lane, and working it for one full day's run. The Adnun Black Top Pavers, which laid the hot-mix, then moved back during the night and the adjoining strip was brought up the next day. The leveling course was carried through to the end of the plant setups, and the wearing surface was then laid next in the same manner. Then the plant and the laydown crew of the first setup moved on to the next stockpile site.



C. & E. M. Photo

An Adnun Black Top Paver lays hot-mix on the McCorkle job, as a Buffalo-Springfield roller rounds a curve.

The crushed-rock subbase was primed with 0.25 gallon of MC-3 per square yard, about 2 miles ahead of paving. A blot coat of $\frac{3}{8}$ -inch-0 crushed gravel was bladed over this priming so traffic could use those parts of the job over which no detour was possible. A Standard Steel distributor applied the MC-3 at about 200 degrees F, full width over the pavement. The shoulders were not primed.

The first lane of mixture was laid to a string line, and the adjoining lane was placed by overlapping the first lane from one to 2 inches. Rakers then followed behind the spreading machine and pushed the hot-mix back over the center-line joint so that the roller would compact the joint thoroughly.

Two Buffalo-Springfield rollers were on the job: a 14-ton 3-axle tandem and an 8-ton tandem. The 14-ton machine would have pushed and cracked the pavement during the hottest summer weather. The most satisfactory way to handle it was to give it a breakdown rolling with the 8-ton tandem, wait until the next day, and roll it with the 14-ton 3-axle tandem. When the second layer or wearing course was laid during late summer and fall weather, each spreading crew was required to use two rollers to compact the pavement.

A small laydown crew handled the big output of each plant. There were only 2 screed men, 2 rakers, and an operator at each Adnun machine. Two foremen and 4 roller operators com-

(Concluded on next page, col. 2)

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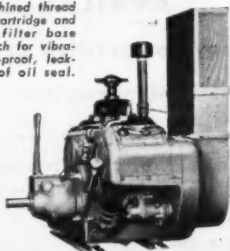
Dirty oil is one of the worst causes of engine wear and expense. You can add many extra H.P. Hours of dependable service to the life of your Wisconsin Engine by keeping the oil free from dirt, filings and sludge-acid that accumulate in the crankcase.

The new MICRO-FINE OIL FILTER CARTRIDGE removes solids that measure less than 1/10,000th of an inch in diameter . . . and will hold its own dry weight of acids, dirt and filings! And it costs no more, and possibly even less than Oil Filters you have been using!

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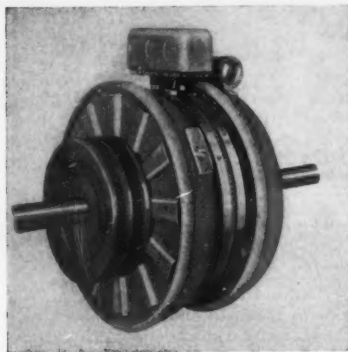
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Five different sizes are available with torque values ranging from 16 to 700 pound-feet over a speed range of zero to 4,000 rpm. Standard voltages for brakes and clutches are 6 and 90 volts; the latter is the output of a rectifier used with a 110-volt ac input.

Catalog No. 701 completely outlines the features of these units. It includes a general description of the operating mechanism, a selection chart, data for torque and heat-dissipation calculations, and detailed specifications.

The catalog may be obtained from the company, or by using the Request Card at page 16. Circle No. 774.

Liquid-Transfer Pump

A new rotary hand pump designed to deliver 15 gpm has been developed by K-P Mfg. Co., 1226 Linden Ave., Minneapolis 3, Minn. The Model H-10 transfer pump handles gasoline, kerosene, motor and tractor oil, distillate, antifreeze, benzene, and similar liquids. It can be mounted on marine engines; steel drums; portable, transfer, or storage tanks; and wood barrels.

Furnished with a 42-inch length of 3/4-inch suction pipe, the self-priming unit has a special bung screw to fit a 1 1/2 or 2-inch drum or tank opening, and is equipped with a non-drip spout. Self-adjusting sliding carbon vanes insure positive suction at all times, the company says. Suction lift is in excess of 10 feet. A quick-change threaded hose coupling permits an 8-foot hose to be quickly and easily installed. The hose is equipped with a bent pipe on one end, making tractor and truck servicing a one-man operation.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 734.



The Model H-10 rotary hand pump delivers 15 gpm of gasoline, kerosene, oil, distillate, antifreeze, etc.

Relocated Highway Gets Hot-Mix Paving

(Continued from preceding page)

pleted the crew.

State Road No. 2-F draws enormous tourist traffic from U. S. 2, and its relocation with asphaltic-concrete surfacing will be widely approved by many a motorist. The entire McCorkle organization is quite skilled from past experience in hot-mix paving in Idaho and Nevada, and the finished pavement was exceptionally smooth.

Personnel

Lee Lowe, as General Superintendent, supervised the field work, assisted by Virgil Johns and Art Dretke, as Paving Foremen; D. J. Tallman and Dick Marshall as Plant Foremen; and Virginia Tallman as Office Manager and Secretary. Stern Eason was Resident Engineer for the Washington Department of Highways.

Line of Face Shields

A new line of face shields, offering user economy through a choice of visors for specific types of hazards, has been introduced by Mine Safety Appliances Co., Braddock, Thomas and Meade Sts., Pittsburgh 8, Pa. The Chipruf visor is specially built to guard the face, eyes, and neck during sanding, light grinding, woodworking, etc. The Chempruf visor is recommended by M-S-A wherever acids, oils, chemicals, gasoline, or hot liquids may splash or spray.

Both visors are interchangeable on the standard M-S-A Headline headgear, which is preformed to fit the natural contours of the head. The headgear is available in three types: full spark-guard, semi spark-guard, and no spark-guard. For protection of extra-large areas the M-S-A Super-Gard face shield is offered with both visor types.

Further information can be secured from the company. Or use the Request Card at page 16. Circle No. 798.

Dust-Collector Catalog

A new 38-page catalog containing illustrations and specifications of the complete line of Dustkop dust collectors, available in standard pretested units, has been issued by Agat-Detroit Co., 206 First National Bldg., Ann Arbor, Mich.

Illustrations show almost every typical dry-grinding dust-control problem; considerable space is also devoted to buffing and polishing dusts as well as to the control of chips and shavings from both wood and metal-working machines. A cross index permits the reader to locate the recommended Dustkop, either by known cfm capacity requirement or by the general classification of the dust involved. Control of vapor and mist from various wet-grinding and machining operations is also dealt with. Accessories for installing Dustkops—branch pipe, hose, hoods, blast gates, etc.—are illustrated and priced.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 709.

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At Mt. Carmel, Pennsylvania, three 16-ton C Tournarockers haul 225 pay yards of clay, sand, and rock overburden hourly on 4200' cycles for J. Robert Bazley, Inc.



1 Haul anywhere . . . Plenty of power with big tire traction takes fully-loaded Tournarocker up steep grades, over rough roads, soft fills where ordinary trucks can't go.



2 Speed loading . . . Shovel operator has big, wide target with all Tournarockers. Body opening on 9-ton model is 7' x 11'; on 16-ton, 8' x 12½'; on 35-ton, 10'2" x 16'10".



3 Cut spotting delays . . . Short 90° turns and positive power steer by push-button controls quickly position rig under dipper. Multi-disc air brakes assure instant stops.



4 Work fast in tight quarters . . . power steer, 90° turns, electric controls, air brakes, speeds of 28 to 35 m.p.h., all contribute to fast haul over narrow, winding roads.



5 Reduce time dumping . . . a touch of electric switch activates hoist motor. There's no delay for hydraulic pressure to build up. Loads fall free and FAST!



6 Cleans load every time . . . even in sticky clay, Tournarocker dumps clean. Siream-lined body "rocks" quickly to vertical position. No material rides back to excavator.



7 Save dump clean up . . . Front-wheel drive lets Tournarocker back to edge of fill, dump clear over bank. This eliminates dozer clean-up, provides continuous fast dump.



8 Cut weather delays . . . haul even when crawlers can't. Giant tires increase flotation. Tournamatic differential applies 4 times the pull to wheel on firmest footing.



9 Reduce maintenance . . . because Tournarocker has no hydraulics highpressure jack lines, or long driveshafts, common troubles of other rear-dumps are eliminated.



R. G. LeTOURNEAU, INC., Peoria, Illinois

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